

STUDENTS' COGNITIVE STYLES AS INDICATORS  
OF SUCCESS WITH AN AUDIOVISUAL-TUTORIAL  
INSTRUCTIONAL PACKAGE IN TYPEWRITING

By

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To my wife, Sheryl

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Abstract of Dissertation Presented to the Graduate  
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STUDENTS' COGNITIVE STYLES AS INDICATORS  
OF SUCCESS WITH AN AUDIOVISUAL-TUTORIAL  
INSTRUCTIONAL PACKAGE IN TYPEWRITING

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The purpose of this study was to determine if the degree of match between an individual student's cognitive style and a theoretical cognitive style map established by a panel of experts for an audiovisual-tutorial typewriting (AVT) package was an indicator of the degree of success which that student would achieve through interaction with the package.

The sample consisted of the 17 students enrolled in Elementary Typing I at Tompkins Cortland Community College in Dryden, New York. A Cognitive Style Mapping Inventory was administered and a map for each student was established. A cognitive style map for the AVT package was determined by a

panel of experts and represented the elements deemed necessary for a typing student to be successful in gaining information from the AVT package.

At the end of the semester the typing theory, production, speed and accuracy and overall grades of the students were determined by the instructor. Students were ranked in three match groups and then a comparison was made between the student's degree of match with the AVT package and their typing grades to determine if any significant relationship existed. Data were analyzed by the Kolmogorov-Smirnov two-sample statistical test of significance. Twelve operational hypotheses were generated to answer the basic questions of the study and an additional three hypotheses were generated to test if any relationship existed between students who failed to pass the course and their level of match.

The results of this study revealed that

1. No significant difference was found among any of the three cognitive style match groups (high, medium, or low) in the scores of achievement in typewriting theory when measured in pairwise comparison.

2. No significant difference was found among any of the three cognitive style match groups (high, medium, or low) in the scores of achievement in typewriting production when measured in pairwise comparison.

3. No significant difference was found among any of the three cognitive style match groups (high, medium, or low) in scores of achievement in typewriting speed and accuracy when measured in pairwise comparison.

4. No significant difference was found among any of the three cognitive style match groups (high, medium, or low) in the scores of achievement in the overall course grade when measured in pairwise comparison.

## CHAPTER I

### INTRODUCTION

#### Statement of Purpose

The purpose of this study is to determine if the degree of match between an individual student's cognitive style and a theoretical cognitive style map established by a panel of experts for an audiovisual-tutorial typewriting (AVT) package was an indicator of the degree of success which that student would achieve through interaction with the package.

#### Need for the Study

According to Cross (1976) there is an increasingly urgent need for educators to develop more effective methods of teaching. Nowhere is this need more evident than in the community college. The academic abilities of students is one of the most researched areas in higher education; yet, a special challenge exists for the community college in dealing with its students for whom traditional methods of instruction may not be appropriate. Students are being admitted to the community college with a variety of entering skills and learning characteristics, and Cross does not feel that present day community college faculty

members are prepared for this level of classroom heterogeneity. She concludes that these students have some talents that are not being developed in the traditional curriculum and recommends utilization of individualized instruction, mastery learning, and self-paced modules, all of which necessitate an understanding of students' individual learning styles by the instructional designer.

In a study sponsored by the Carnegie Commission on Higher Education in 1971, Medsker and Tillery concluded that students entering community colleges have extremely diverse backgrounds--coming from almost all levels of academic ability, achievement, family background, and motivational level (Medsker and Tillery, 1971). Due to this diversity, teachers and administrators must "work together towards student achievement through teaching methods, grading practices, individualized instruction, advanced placement tests, and adequate counseling and guidance" (p. 158).

The call for individualized instruction, as cited by Cross, Medsker, and Tillery, is not new to education. Programmed instruction (Davis et al., 1970), computer assisted and computer managed instruction (Holtzman, 1970), audio-tutorial (Edling, 1970), and other techniques utilizing specialized hardware and software, combined with variance of schedules and variance in classroom environments, have been attempted to meet the individualized needs of students.

One technique for individualizing instruction was tested by Edwards (1968) at Lansing Community College in Michigan. He compared traditional lecture methods of teaching business machines applications and typewriting with experimental teaching employing the use of slides and audiotape recordings in an open laboratory skill center. Differences in the two groups of students indicated that the experimental group learned significantly more as measured by the final performance tests. The package of slides and audiotape recordings utilized by Edwards in the study has subsequently been produced commercially by the Media System Division of Harcourt, Brace, Jovanovich Publishing Company and is one of the principle tools employed in this study.

Open laboratory skill centers, as described above, have enjoyed rapid growth in community colleges and their successes have been documented in programs of individual instruction (Cross, 1976).

Callahan reports on the maximization of physical and human resources through the use of the audiovisual-tutorial skill center, at a cost effectiveness that is "somewhat startling . . . with these skills centers as the heart of the program--a facility that is open to students day and night, equipped with audiovisual-tutorial material that allow for self-paced study of a subject, staffed by both teachers and trained assistants--the educational goals of community colleges are receiving new impetus" (Callahan, 1977, p. 27).

What this open-lab technique and many of the other individualized approaches lack, however, is a method for matching the individual to the particular instructional package in terms of his or her unique learning style.

The increasing emphasis upon the learner's relationship to the educational environment has been described in contemporary publications. Bloom's (1973, 1976) "mastery learning" involves the use of behavioral objectives, criterion referenced assessment and greater attention to the individual learner's needs.

Gagne' (1970) suggests that individuals may be either visually minded or auditory minded and, therefore, learn better from visual presentations or auditory presentations, respectively.

Campeau (1966), in her review of media and education, suggests that the limited usefulness of research in instructional development and educational media is because of a failure by the researchers to analyze carefully the influence of the learner's characteristics on the experimental results. The Aptitude Treatment Interaction studies as reviewed by Cronbach and Snow (1977), and Allen (1975) support this view of the importance of the interaction of the learner's characteristics with the instructional treatment.

Bass (1974), in summarizing the works of Tyler, Hamerus, and Gustad, and the Commission on Instructional Technology,

states that the three factors that must be taken into account by educators when seeking solutions to instructional problems are the student's characteristics, the instructional strategy, and "some unifying conceptual framework within which decisions can be made concerning both the student and the strategy" (Bass, 1974, p. 5).

A relatively new and promising approach to the consideration of the needs and characteristics of the learner is supported by research that has been conducted through the Institute for Educational Sciences by Joseph E. Hill and his staff at Oakland Community College in Bloomfield Hills, Michigan. They perceive the Educational Sciences as a process through which the personal characteristic of learners and the processes through which they learn can be interpreted and classified (Hill, 1968). The Educational Sciences are classified into seven categories (also termed sciences) which will be described in Chapter II. They are as follows:

1. Symbols and their meanings
2. Cultural determinants
3. Modalities of inference
4. Biochemical and electrophysiological aspects of memory-concern
5. Cognitive style of the individual
6. Teaching, administrative, and counseling styles
7. Systemic analysis decision making



Cognitive style in the Educational Sciences is a method for describing how an individual seeks meaning from his/her surroundings, interprets and attempts to reason with that meaning.

This study will explore the effectiveness of a specific kind of individualized instruction for specific individuals through analysis of the instruction and the individual characteristics of the students who interact with it within the framework of the Educational Science of Cognitive Style.

### Significance of the Study

In Oakland Community College's Personalized Education Program (PEP) a number of alternative learning situations have been developed for students with different learning styles. For each of these alternative situations (programmed text, video tape recorder, youth-tutor-youth training, library books and microfilms, enrichment seminars, rap sessions, traditional lecture, and independent study), a hypothetical map has been developed that indicates which elements are probably necessary in a student's map for that student to achieve a basic understanding of the material presented.

The present study is based upon the premise that an individual must have a specific set of elements in his/her cognitive style map if he/she is to learn effectively from an audiovisual tutorial instructional package.

### Method

The sample of students for this study was drawn from students enrolled in Introductory Typewriting I, a course taught via AVT in the Business Administration Division of Tompkins Cortland Community College in Dryden, New York. Data on each student's cognitive style were obtained through the use of the Cognitive Style Mapping Inventory developed by the Oakland Community College faculty. Success in typewriting was judged by tests in typing theory, typing production, and tests of typing speed and accuracy.

The degree of match between the student's map and the theoretical map for the AVT package was determined by way of a formula developed by Hill.

The expectation is that those students whose maps most closely match the map for the AVT package will out-perform those students whose maps less closely match the map for the AVT package.

The AVT package was viewed by a panel of experts to determine the elements of cognitive style necessary in a student's map for successful interaction with the package.

### Definition of Terms

1. Audiovisual Tutorial Instruction - An instructional method combining programmed text, prerecorded audiotapes,

and sets of slides in an instructor-monitored open laboratory skill center.

2. Cartesian Product - A particular type of space or set whose elements may be combined into profiles defined over that space. The "X" sign does not denote any algebraic or numerical operation but indicates that elements from each of the sets depicted must be combined to determine the exact reference points of each multi-element profile in the space.

3. Cognitive Style - A concept for describing an individual's mode of behavior in searching for meaning. An individual's cognitive style is determined by the way he/she takes notice of his/her total surrounding. It is identified by an individual's disposition to use certain types of symbolic forms vs. others, the derivation of meaning of those symbols from roles the individual has found most satisfying and the manner in which he/she reasons.

4. Cognitive Style Map - A picture of the way an individual derives meaning from his/her environment. A map of an individual's cognitive style provides a look at the way in which he/she derives meaning and is based upon his/her use of symbolic orientation, personal experiences, and ways of reasoning (Bass, 1972).

5. Cultural Determinants - The part of a person's cognitive style that reflects that person's preference for influence on his/her search for meaning.

6. Educational Sciences - A common structure within which inquiry of significance for the fundamental aspects of the applied field of education can be conducted. The concept of the educational sciences was developed to create a conceptual framework and language for the study of the educational process.

7. Major Orientation - When the student scores 75 percent or more on the test for the particular element in his/her cognitive style map that person is said to have exhibited a major orientation (Bass, 1972).

8. Minor Orientation - When the student scores between 25 and 74 percent on the test for the particular element in his/her cognitive style map he/she is said to have exhibited a minor orientation (Bass, 1972).

9. Modalities of Inference - A set of elements which indicate the person's way of making sense out of the information which he/she collects from his/her environment.

10. Negligible Orientation - When the student scores less than 25 percent on the test for the particular element in his/her cognitive style map he/she is said to have exhibited a negligible orientation.

11. Qualitative Symbols - Symbols used by the individual to convey feelings, commitments, and values; and to provide insight into one's self. Qualitative symbols represent to the individual's nervous system that which they actually are (for example, seeing a cup).

Theoretical Symbols - Spoken or written words or numbers which represent the meaning something in the environment has for an individual. Theoretical symbols present to the nervous system and then represent to it something different from that which they themselves are. For example: the spoken word "cup" is an auditory symbol which presents to the nervous system a sound which represents an image of a cup.

Questions to be Answered

1. Do students with the highest degree of match with the AVT package attain higher typing theory scores than those with the lowest degree of match?
2. Do students with the highest degree of match with the AVT package attain higher typing theory scores than those with the medium degree of match?
3. Do students with a medium degree of match with the AVT package attain higher typing theory scores than those with the lowest degree of match?
4. Do students with the highest degree of match with the AVT package attain higher typing production scores than those with the lowest degree of match?
5. Do students with the highest degree of match with the AVT package attain higher typing production scores than those with a medium degree of match?

6. Do students with a medium degree of match with the AVT package attain higher typing production scores than those with the lowest degree of match?

7. Do students with the highest degree of match with the AVT package attain higher typing speed and accuracy scores than those with the lowest degree of match?

8. Do students with the highest degree of match with the AVT package attain higher typing speed and accuracy scores than those with a medium degree of match?

9. Do students with a medium degree of match with the AVT package attain higher typing speed and accuracy scores than those with the lowest degree of match?

10. Do students with the highest degree of match with the AVT package attain higher grades in the typewriting course than those with the lowest degree of match?

11. Do students with the highest degree of match with the AVT package attain higher grades in the typewriting course than those with a medium degree of match?

12. Do students with a medium degree of match with the AVT package attain higher grades in the typewriting course than those with the lowest degree of match?

### Summary

The interest by educators in developing more effective methods of individualizing instruction has been intensified in recent years and is nowhere more evident than in the community college. This interest in improving the learning process has fostered the development of the Educational Sciences within which the individualization of the instruction and classification of learners in terms of cognitive style are emphasized. This study will analyze student interaction with an audiovisual tutorial (AVT) package to see if the individual's cognitive style is an indicator of success with the AVT package. It has special significance for educators and institutions who plan to augment the individualization of learning through the open laboratory AVT approach.

### Overview of Chapters

A general statement of the problem and its relationship to relevant facts and concepts was developed in Chapter I. This included a statement of the purpose, an explanation of the need for the study, its significance, definition of key terms and a summary.

Chapter II contains a review of selected related literature and is divided into five major areas: (1) Theories and Research on Cognitive Styles; (2) The Educational Science of

Cognitive Style; (3) Studies within the Educational Sciences of Cognitive Style; (4) Matching Instruction to Students via Cognitive Style; (5) Audiovisual-Tutorial Individualized Instruction.

The design of the study and data collection procedures followed in the research are reported in Chapter III, including a statement of the hypotheses to be tested.

The results of the study and analysis of the data are presented in Chapter IV.

Chapter V summarizes the study, draws conclusions and suggests implications for further research.



## CHAPTER II

### SELECTED LITERATURE

The following literature review is presented in the areas of (1) Theories and Research on Cognitive Styles, (2) The Educational Science of Cognitive Style, (3) Studies within the Educational Sciences of Cognitive Style, (4) Matching Instruction to Students via Cognitive Style, and (5) Audiovisual-Tutorial Individualized Instruction.

#### Theories and Research on Cognitive Styles

Cognitive style refers both to individual differences and general principles of cognitive organization (e.g., simplification and consistency trends) and to self-consistent idiosyncratic tendencies that are not reflective of human cognitive functioning in general (i.e., intolerance of ambiguity, memory for particular types of experiences). It reflects differences in personality organization as well as genetically and experientially determined differences in cognitive capacity and functioning. (Ausabel and Fitzgerald, 1971, p. 500)

Ausabel and Fitzgerald see cognitive style in relation to cognitive organization. Many have used the term "cognitive style" in psychological literature to represent various constructs of conceptualization or organization theory. Klein (1951) describes "cognitive styles" as the distinctive ways an individual "deals with" reality.

Broveman and Lazurus (1958) use two constructs in describing cognitive style. When dealing with a new or difficult task, they describe cognitive style as conceptual or perceptual. When dealing with a task that is not new or difficult, they describe cognitive style as either strong or weak automation.

Kagen, Moss and Sigel (1963) describe cognitive style as one's preferred method of categorization of visual representation. They identify three types of categories: (1) Descriptive - objective, physical attributes, (2) Relational - conceptual - functional categorizational style, and (3) categorical inferential - based on inferred characteristics. Sigel's (1966) later studies further indicate that an individual's cognitive style varies with social class, age, and certain personality characteristics.

Another cognitive style construct described by Witkin and associates (1962) is that of field dependence/field independence. They describe the field dependent individuals as needing visual cues to align their body vertically and generally lacking the capacity to distinguish figure - ground relationships. The field independent individual, however, has an innate sense of his/her body position in space and could distinguish the figure from the ground. They further observed that infants appeared to be field dependent, which indicates that field independence was probably part of a maturation process.

According to Berke (1976), Hill and his associates have built upon the concepts of Kagen, Moss, Sigel, Witken, and others in developing the construct of Educational Cognitive Style--the way in which an individual acquires meaning.

### The Educational Science of Cognitive Style

The concept of the educational sciences was developed to create a conceptual framework and language for the study of the educational process. This framework consists of seven sciences described below and illustrated by the following cartesian Products of Sets in Figure I.

Symbols and Their Meanings - Individuals acquire meaning and knowledge through symbols. Therefore, the mediation of the symbol into something that is meaningful to that individual is the sole purpose of the educational process. The study of the individual's symbolic orientation is pertinent to the determination of teaching methods and materials which match the individual's symbolic orientation. This science is based on the work of Cassier, Dewey and others (Wasser, 1971, p. 3) and refers to the ability of individuals to acquire and assimilate meaning through two types of symbols. Theoretical symbols present to the nervous system of the individual something other than that which the symbol itself represents (the written or spoken word "frog"). Qualitative symbols present and represent to the nervous system of the individual that which the symbol itself is to the individual (seeing a frog itself).

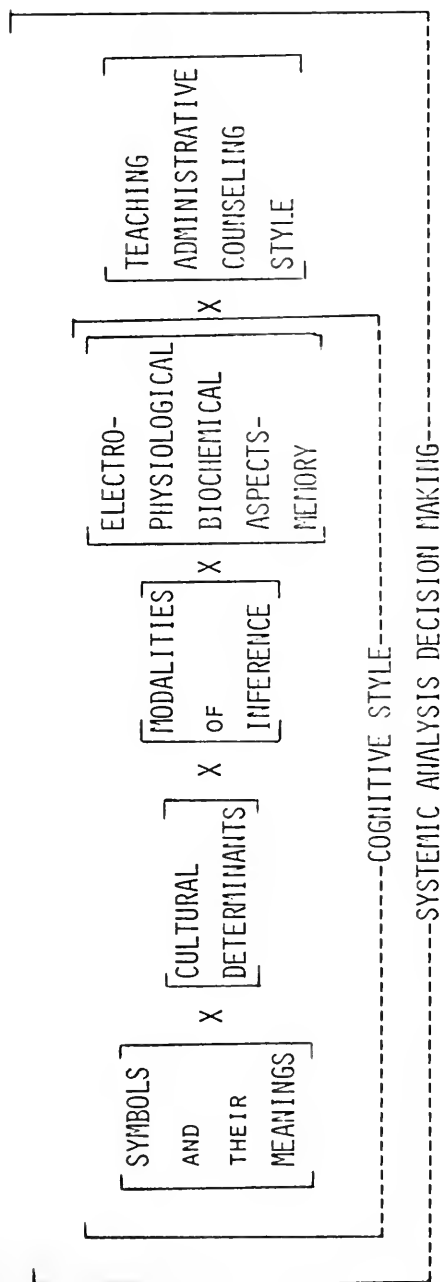


Figure 1. Cartesian Product of Sets of Educational Sciences

Theoretical symbols can be divided into visual and auditory classes and then further divided into linguistic and quantitative classes creating a four-element breakdown (Wasser, 1971, p. 5):

1. T(VL) Theoretical Visual Linguistic - finding meaning in words we see.
2. T(AL) Theoretical Auditory Linguistic - finding meaning in the words we hear.
3. T(VQ) Theoretical Visual Quantitative - finding meaning in numerals we see.
4. T(AQ) Theoretical Auditory Quantitative - finding meaning in the numbers we hear.

(Hill and Nunney, 1971, p. 5)

There are 20 qualitative symbols whose meanings are derived from (1) story stimuli, (2) cultural codes, and (3) programmatic effects of major events on objects (Wasser, 1971, p. 13).

The five sensory stimuli are:

1. Q(A) Qualitative Auditory - the ability to perceive meaning through the sense of hearing (non-linguistic).
2. Q(O) Qualitative Olfactory - the ability to perceive meaning through the sense of smell.
3. Q(S) Qualitative Savory - the ability to perceive meaning through the sense of taste.
4. Q(T) Qualitative Tactile - the ability to perceive meaning through the sense of touch.

5. Q(V) Qualitative Visual - the ability to perceive meaning through the sense of sight (non-linguistic).

The five qualitative codes related to programmatic effects are:

1. Q(P) Qualitative Proprioceptive - the ability to combine or coordinate several senses into a specific function or operation (such as running toward and catching a baseball - or typing from written material).

2. Q(PK) Qualitative Proprioceptive Kinematics - a subset of Q(P) relating to motor skills (playing the piano from sheet music).

3. Q(PT) Qualitative Proprioceptive Temporal - a subset of Q(P) relating to timing (the exact moment to "spike" a volleyball).

4. Q(PD) Qualitative Proprioceptive Dextral - a subset of Q(P) relating to right-hand predominance.

5. Q(PS) Qualitative Proprioceptive Sinstral - a subset of Q(P) relating to left-hand predominance.

The remaining 10 qualitative symbols are associated with cultural codes:

1. Q(CEM) Qualitative Code Empathetic - the ability to put one's self into another's place and have feeling for the other person.

2. Q(CES) Qualitative Code Esthetic - the ability to enjoy the beauty of an object or an idea.

3. Q(CET) Qualitative Code Ethics - the commitment to specific values or duties.

4. Q(CH) Qualitative Code Histrionics - the ability to deliberately stage behavior or emotion to produce a desired effect.

5. Q(CK) Qualitative Code Kinesics - the ability to communicate and read non-verbal body motions and positions.

6. Q(CKH) Qualitative Code Kinesthetics - the ability to produce muscular coordination according to acceptable form (the figure skater).

7. Q(CP) Qualitative Code Proximics - the ability to judge the critical, physical, and social distance between oneself and another as perceived by the other person.

8. Q(CS) Qualitative Code Synnoetics - an honest knowledge of one's abilities.

9. Q(CT) Qualitative Code Transactional - ability to influence the actions and/or goals of others.

10. Q(CTM) Qualitative Code Temporal - having a sense of acceptable social timing as perceived by the other person (Hill and Nunney, 1971, p. 5).

#### Cultural Determinants

The symbols bringing knowledge and meaning to man will be determined and shaped by the person's culture and sub-culture. A person does not interpret the theoretical and qualitative symbols as a unique being, he interprets them as a person cast into a role that has specific expectations imposed on it. These expectations may be imposed by societal norms, peers, or associates, or the family and extend influence on the person through his life. (Fragale, 1971, p. 4)

What, therefore, a person perceives as the meaning of a symbol is greatly determined by one of the three cultural determinants.

1. A - Associates - groups with whom the person has contact and who may be involved with the person in the situation.

2. F - Family - either immediate or extended - which tends to establish guidelines of behavior from early age.

3. I - Individuality - individuals predisposed to utilize their judgment alone in problem interpretation and solution.

Modalities of Inference - The meanings of symbols are greatly influenced by the pattern of inference the individual tends to employ. In this science four inductive inference patterns for drawing probability conclusions and one deductive pattern are described.

1. M - Magnitude - categorical classification and thinking - using rules and definitions.

2. D - Difference - making one-to-one contrasts of selected characteristics or measurements.

3. R - Relationship - comparing relationship or traits of two or more characteristics or measurements.

4. L - Appraisal - a unique process providing equal weight to the consideration of Magnitude, Difference, and Relationship in the process of making a probability conclusion (Hill and Nunney, 1971, p. 5).

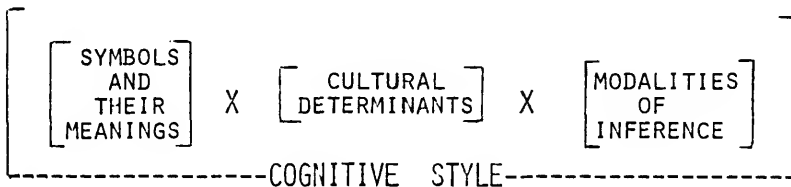


5. Deductive - in addition to the above inductive reasoning processes, individuals may also employ deductive inferential patterns (Wasser, 1971, p. 5).

Biochemical and Electrophysiological Aspects of Memory-Concern - This science is the least developed of the educational sciences even though it is an essential element to an individual's cognitive style. Recent study by psychobiologists and biochemists have indicated that there may be a two-stage memory process which distinguishes short-term memory from long-term memory. This science is not presently utilized in the mapping process.

The Cognitive Style of Individuals - The science of cognitive style is made up of elements from the first four sciences. These elements are organized into a cartesian product of sets to provide a picture or "map" of the style utilized by the individual in seeking meaning from his/her environment (Figure 2). Although the biochemical and electrophysiological aspects of memory-concern are included in the framework of the cognitive style of the individual, only the first three sciences are included in the "map" and this study.

Figure 2. Cartesian Set of Cognitive Style



Cognitive style can be used as a means for diagnosing the way an individual learns and for prescribing specific activities that would provide the individual with a high probability for success in a specified learning situation.

According to Hill, it is necessary that a cognitive style analysis be made not only of the student, but also of the learning task. Both are required if the construct of cognitive style is to be used as an effective tool for improving upon the more conventional methods of analyzing and evaluating the learning process (Hill, 1968). Used in this way, cognitive style analyses can actually compare the method that the student is using for dealing with the symbols with the symbolic conditions of the learning task. This comparison is a key element in this study.

Teaching Style, Administrative Style and Counseling Style - Even though cognitive style is a fundamental aspect of the educational process, it does not completely explain all aspects of that process. Other factors are necessary to fully explain these processes.

1. Teaching Style: Depending upon the way the teacher responds to the teacher/student relationship the teacher can be classified as authoritative, adjustive, or flexible.

2. Administrative Style: Education is influenced by the administrative decision-making process. These processes can be classified as either dominant, adjusting, cooperative, or passive-custodial.

3. Counseling Styles: The counselor's order of priorities for the generic elements of the counseling process--person, processes and properties - is combined with a decision on whether the goal setting is the counselor's or the client's responsibility. From this combination of elements the counselor's style can be classified into either distinctive, situational, or nondirective (Hill, 1968, p. 16).

Systemic Analysis Decision Making - Hill describes systems as a collection of elements with their interconnections - considered over a period of time (Hill, 1968, p. 18). The Educational Science of Systemic Analysis Decision Making is the construct which combines the other six sciences into an organized whole. The design criteria of the educational sciences system is to model the education process for analysis and decision-making to optimize its efficiency and effectiveness.

The educational sciences as described above have been proposed by Hill as a conceptual framework for the applied field of education. Rather than being regarded as isolated and unrelated facts, the educational sciences can act as tools to provide information to educators in an organized system with a generally accepted language.

#### Studies Within the Educational Sciences of Cognitive Style

During the past 20 years over 100 doctoral dissertations dealing with the Educational Sciences have been completed. Many of the clarification studies have dealt with the interaction of student style with teacher or subject or instruction

style. Research that specifically deals with Cognitive Style is pertinent to this study, and some of the most significant studies will be reviewed in this section.

Zussman (1968) states that the purpose of his study was "the clarification, explanation, and suggested application of the first three strata of the Educational Sciences." He determined that there is a cognitive style which can be identified for public school administrators and also for community college administrators. The difference between the cognitive styles of the two can be identified (p. 14).

Wasser (1969) studied the similarity and dissimilarity of teacher and pupil cognitive styles with reference to the grades received by pupils in various subjects taught in elementary schools. The study indicated that students having cognitive styles judged similar to the teacher's received higher grades than did those who were not similar. Wasser also pointed out that an individual's symbolic success (possession of symbolic attributes - Stratum I) is more important to his/her scholastic success than the manner in which he/she infers thought or ideas (Stratum III) or the particular cultural determinants which influence his/her symbolic meaning (Stratum II).

Fragale (1969) found collective cognitive styles existed for both industrial technology teachers and students and that matching of the teacher and students according to their cognitive styles positively effected the students' level of academic success.

Schroeder (1970) confirmed that students in English classes with cognitive styles similar to that of the instructor received higher grades than did those students whose styles significantly differed from that of the instructor; the similarly matched student also perceived the instructor as being more effective.

Lange (1972) studied the effects on learning when matching cognitive style of students and instructors in nursing education and concluded that the failure-withdrawal rate of the matched groups was significantly different from the non-matched and that the more elements present on a student's cognitive map the greater is his/her chance of success in nursing education.

Bass (1972), in his study for developing procedures for measuring and mapping qualitative symbolic orientation, used videotape to draw positive correlation between what students thought was their level of symbolic orientation and their actual level. Another result of Bass's study was that the three to four hour paper and pencil Oakland Cognitive test battery could be replaced, in certain qualitative areas, by a shorter videotaping procedure and still be predictive of classroom performance.

Wyett (1967), as a result of his exploratory study of a group of teachers who participated in the Teacher Education Experimental Project at Wayne State University, indicated that a general cognitive style orientation can be established for a particular teacher in a given teaching situation. Once

this was determined, he suggests that the cognitive style of a teacher strongly influences his/her teaching style. He also found that instructors who were placed in teaching situations which were not in keeping with their cognitive styles did not perform as well as did those who were properly matched.

Shuert (1970) was able to identify certain unique cognitive style characteristics for students who were successful in a particular math course. This supports the concept of others such as Blanzky (1970) and Spitler (1970), that there is a definite relationship between student cognitive style characteristics and their success in mathematics.

Hoogasian (1970) determined that there is a direct correlation between a student's chance for success (and higher letter grade) and the number of elements (major or minor) in their cognitive style profile.

Schuendinger's (1976) study examined the importance of Modalities of Inference, in relation to school achievement. He found that subjects with four major modalities achieved significantly higher spelling scores on the Iowa Test of Basic Skills than did subjects with three major modalities.

Ogden and Brewster (1977) identified common and unique elements in the composite cognitive styles of successful and unsuccessful (and male and female) science students at the secondary level.

Boyer (1976) derived cognitive style maps for ten occupational areas (accounting, finance, credit, secretarial, clinical lab assistant, medical assistant, licensed practical nurse, drafting technologist, electronics technologist, and surface mining operation technologist). His thesis was that each occupational area requires a person having a particular cognitive style compatible with the requirement of the job style.

#### Matching Instruction to Students via Cognitive Style

The following studies represent the initial research that has been completed relating to the matching of students' cognitive styles to specific types of instruction (individualized - multimedia, programmed instruction, didactic film, simulation games, computer assisted instruction, audio-tutorial instruction, and videotape instruction). These studies are described below in an effort to support the need for a study utilizing the Educational Science of Cognitive Style as a method for predicting student success in audiovisual-tutorial instruction.

Warner (1970) discovered that students with certain elements in their cognitive style map are amenable to a lecture discussion approach to a life science course while students with other elements prefer a more individualized multimedia approach.

Blanz (1970) determined that the success of students in math is related to certain patterns in their cognitive style and that if their map showed a strong reliance on the individual

(themselves) as a cultural determinant, they would be more successful learning math through the use of programmed instructional materials. Spitler (1970) reaffirms the above and calls for a new model for the study of mathematics.

Strother (1973) found that students with a strong cultural code I, inferential pattern R and auditory orientation T(AL) - T(AQ) had a greater degree of achievement from the use of didactic films.

Hand (1972), in a study involving the matching of programmed instructional packages to particular students, found that success could be predicted on the basis of cognitive style.

DeNike (1973) found that certain educational cognitive style elements were found to be common to students who achieve with cognitive learning when simulation games are employed as the instructional strategy.

Stringfellow's (1975) findings indicated that a higher degree of match between a student's map and that of the Computer Assisted Instruction (CAI) package would result in an improvement in performance on the CAI package.

Terrell (1974) was able to support his contention that the matching of Life Science students' cognitive styles to the cognitive style of the instructional mode (audio-tutorial) would reduce debilitating anxiety levels in the students and allow the students to achieve higher grades than those that are non-matched.



Brose (1974) investigated the significance of the degree of match between college students and a videotape instructional package to predict success with the package.

#### Audiovisual-Tutorial Individualized Instruction

Interest in individualization is not new to education. Many contemporary publications and much research have focused upon the hypotheses that students are unique individuals who learn best while proceeding at their own pace in an environment geared to their particular needs. Postlewait (1969), Keller (1974), and others have designed instruction for the student as an individual.

Fry (1970) classifies four categories of variables utilized to individualize instruction: personality, cognitive, inquiry and sequencing. He describes more than 50 studies investigating them.

Cronbach and Snow (1977), in the first chapter of their review of aptitude treatment interaction studies, describe a "Talent Department" operation. By matching a student's unique characteristic to the specific instructional techniques to enhance their learning, maximum achievement is possible.

Campbell (1972) concluded that certain personality characteristics of students were important contributors to success in the utilization of learning activity packages employed for individualizing science instruction at NOVA High School in Broward County Florida.

Blackburn (1974) determined that students taught by a self-paced modularized method achieved at a significantly higher level and rated their course more positively than those who were taught the same subject by traditional methods.

Edwards (1968) compared traditional lecture methods of teaching business machine applications and typewriting with an experimental group taught in an open laboratory skill center employing the use of slides and accompanying audiotape recordings. Differences in the two groups of students indicated that the experimental group learned significantly more as measured by the final performance tests. Students' affective responses at the end of the instructional period indicated that those students who experienced the audiovisual-tutorial approach had a more positive attitude toward typing instruction than did those students who experienced the traditional lecture approach.

Gagné' (1965) asserts that individuals can be either "visual-minded" or "auditory-minded" and learn better from visual presentations or audio presentations, respectively. In a study he conducted for the U. S. Office of Education, Department of Health, Education, and Welfare, he implied that pictorial presentations can be of considerable usefulness enhancing both retention and transfer.

Contrary to these implications, prominent reviewers, such as Cronbach and Snow (1977), Campeau (1966), Allen (1975),

Levie and Dickie (1973), and Lumsdaine (1963), have found it at times difficult to find studies which confirm Gagne's assertions.

DeNike (1976) confronts these inconclusive results of researchers in the educational media field and questions whether this state is due to the nature of the research or the shortcomings of the instructional strategy. He determined that very little attention is given to the characteristics of the student who learns well under a specific strategy. The studies and the individualizing techniques do not indicate how to insert the individual into the learning environment in terms of his/her learning style. A principle concern of educators should be, therefore, the development of methods of individualizing instruction which might be categorized according to their match-up to the cognitive styles of their target students (p. 67).

#### Summary

Selected research related to Cognitive Style Theories, the Educational Sciences of Cognitive Style, Cognitive Style Mapping, the Matching of Instruction to Students in Terms of Cognitive Style, and the use of Audiovisual-Tutorial Individualized Instruction as an Instructional Tool has been reviewed.

The research has indicated that there is a need to aid the educator in his/her approach to instruction. Individualization has been one technique attempted, with a high degree of

success, by educators. The Educational Science of Cognitive Style was examined and the success of a cognitive style approach for individualization of instruction has been demonstrated.

The studies cited herein indicate that much work of an exploratory nature has been conducted in the area. Many more studies have been completed and are in various stages of completion. This review of the literature provides a background for using the cognitive style concept as a basis for individualizing instruction via audiovisual-tutorial instruction.

## CHAPTER III

### DESIGN OF THE STUDY

This study investigated the effectiveness of using cognitive style mapping as a tool for predicting success with an audiovisual-tutorial instructional package (AVT) in typewriting.

A Cognitive Style Mapping Inventory was administered to 17 students - who represented the entire class of Typing 101, Introductory Typing I, at Tompkins Cortland Community College, Dryden, New York. The degree of match between each student's map and a theoretical map established for the AVT package was determined. (The typewriting course was taught using the AVT approach.)

At the end of the semester the grades of the students were determined by the instructor.

The relationship between data from the students' course grades and their degree of match with the theoretical map for the AVT package were analyzed using the Kolmogorov-Smirnov two-sample tests. The analysis of the data was used to answer the basic questions identified in Chapter I of the study.

#### Population

The population for this study was composed of the 17 students enrolled in Typing 10, Introductory Typing I, at

Tompkins Cortland Community College in Dryden, New York, during the Spring Semester, 1979.

Tompkins Cortland Community College is one of the 30 community colleges in the State University of New York system located in Dryden, New York and serves both Tompkins and Cortland Counties. Dryden is located just north of Ithaca (Cornell, Ithaca College) in upstate New York. The headcount enrollment for the Fall Semester was 2,870 full and part-time students who generated 24,651 credit hours or 1,643 full-time equivalent students.

The students in the population represented the program areas of Secretarial Science (7 students), General Studies (4), Business Administration (2), Clerical Studies (2), and Liberal Arts (2).

The population consisted of 16 women and one man. Two of the students were foreign born (fluent English) and five were above 30 years of age.

Kerlinger refers to this type of nonprobability-cluster sampling procedure as "purposive sampling, which is characterized by the use of judgment and a deliberate effort to obtain representative samples by including presumably typical areas or groups in the sample" (Kerlinger, 1973).

The demographic breakdown of the class was considered to be normal according to the head of the secretarial science department and lead typing instructor, Mrs. Joyce Damery.

The higher percentage of older adult women in the class is due primarily to active recruitment by Tompkins Cortland Community College in the older adult category and the open-door philosophy of the institution. The presence of the foreign born in the class is a result of the proximity of Tompkins Cortland Community College to Cornell University. Many of Cornell's foreign faculty and student's family members attend Tompkins Cortland Community College for undergraduate coursework.

#### Procedure

The Audiovisual-Tutorial (AVT) instructional package in typewriting that was designed for and utilized in the Edwards (1968) study cited in Chapter II and utilized in this study was created at Lansing Community College and has subsequently been produced commercially by the Harcourt, Brace and Jovanovich Publishing Corporation.

The AVT system combines audiovisual materials (slide-tape) and printed materials (programmed text) in an instructional design that permits each student to proceed at a pace and on a schedule that is determined by the student. The course is scheduled in an "open" laboratory at Tompkins Cortland Community College in a four-hour-per-week block, but the student can elect to utilize the laboratory at other times of the day if he/she desires. The blocking of the time allows the student to know when the instructor will be in

attendance. The student may elect to attend more or fewer hours than are scheduled. If he/she chooses to utilize the laboratory at other than the assigned block of time, there is a full-time technical assistant on duty in the lab to provide assistance.

The course consists of 42 lessons. Lessons 1-9 present the alpha-numeric keyboard and the basic operation of the typewriter. Lesson 10 is a review lesson which prepares students to take Theory Test 1. Lessons 11-22 begin the development of typing speed and accuracy. Lesson 23 is a review lesson for Theory Test 2.

Lessons 24-43 continue to emphasize speed and accuracy and in addition present the student with practical typing problems (typing of block-style memoranda, postcards, personal and business letters, envelopes, themes and manuscripts and dealing with such problems as proofreading, vertical and horizontal centering, correcting errors, aligning paper, drawing vertical and horizontal lines, tabulation, dividing words, carbons, and outlines). Lessons 34 and 43 are review lessons for Theory Tests 3 and 4 (Appendix F).

In addition to the four theory tests mentioned above, there are lessons that include skill-building timed writings (Lessons 5, 6, 11-22, and 35-42).

The students work at their own pace; and if they have questions, they may contact the instructor or the technical



assistant. If a student feels that he/she is ready for either a time writing, production test or theory test, he/she must request the instructor's assistance.

The AVT typing pretest is intended to aid the instructor in advance placement of a student in the course if the student had indicated previous typing experience and/or education. It is designed to determine the area of typing in which a student is competent and to reveal those areas in which students need instruction or review. The pretest consists of a typing theory test and two timed writings and is keyed to the lessons of the course.

Of the 17 students enrolled in the course, five were placed at Lesson 10, indicating previous keyboard experience. The remaining 12 students began the course at Lesson 1. The results of this pretest conformed to the expectation of previous experience/course placement as revealed by the investigator's questionnaire (Appendix C) which accompanied the cognitive style mapping inventory administered at the beginning of the course.

#### Course Evaluation

The final course grade (A through D and No Pass) is determined by a weighted average including the four theory tests averaged (30%); two production tests averaged (30%); the three best five-minute timed writings of previewed material averaged (20%); and a final examination (20%).

The four theory tests consist of 50 multiple-choice questions each.

The production tests are product oriented. Test one consists of: a block style memorandum, a postcard, a short theme, and a business letter. Test two consists of production problems in tabulation, an outline with carbon copy, and a top bound manuscript with footnotes.

The timed writing grades are based on the following scale:

<u>Adjusted Gross Words Per Minute*</u>	<u>Grade</u>
45+	A
44	A-
43	B+
41-42	B
40	B-
38-39	C+
36-37	C
34-35	C-
33	NG

\*Four errors or less are allowed in the above words calculation. For each error over four, two gross words per minute are subtracted to calculate grade.

The final examination is a 100-question multiple choice exam.

The theory tests, production tests, final examination, corresponding answer keys, and recommended grading scales

are supplied to the Tompkins Cortland Community College Typing faculty by the AVT publishers. These suggested grading scales are, in fact, the ones utilized to determine the student's grades in the investigated course (Appendix G).

The suggested grading scale for timed writings furnished by the publishers is not used to determine the students' grades in the Tompkins Cortland typewriting course. The faculty members determined that the publisher's speed and accuracy requirements were not stringent enough for their students ( $36 + \text{adjusted gross words per minute} = A$ ). Instead, they felt that the scale described above represented more realistic grades for their students.

Jim Cassella, Director of Sales for the Media System Division of Harcourt, Brace, Javonovich Publishing Company, confirmed that of the 600 community colleges in the United States that have AVT installations - a majority of them use the suggested theory, production, and final examination grading scales but adjust the suggested speed and accuracy scales upward (more gross words per minute for an A).

#### Data and Instrumentation

Student cognitive style maps were determined through the use of the Oakland Community College Cognitive Style Mapping Inventory (Appendix A) developed by members of the Oakland Community College faculty as a short form of the 3-1/2 hour

battery currently in use at Oakland Community College.

Results of a study of Heum and others (1977) yielded strong evidence for the edumetric reliability and validity of the mapping inventory. Hill (Appendix B) describes validity and reliability indices that have been found through the work at Oakland Community College and those doctoral dissertations dealing specifically with community college samples.

The inventory was administered to the typing class on February 8, 1979. The inventory took the students from 45 minutes to one hour to complete. They also completed a short questionnaire (Appendix C) designed to obtain basic personal data and to determine what, if any, typing experience they had.

The cognitive style map for the AVT package was determined by a panel with expertise in cognitive style mapping and represented the elements (symbols and their meanings, cultural determinants and modalities of inference) deemed necessary for a typing student to be successful in gaining information from the AVT package.

The panel consisted of Drs. Ronald K. Bass, William R. Terrell, and Lee J. Mullally, all with experience with cognitive style mapping. Bass, of the Department of Dental Education, University of Florida, has written and consulted extensively in the area of cognitive styles and is involved

with an ongoing mapping program within the University of Florida Dental School. Bass' doctoral dissertation (1972) involved the development of alternative imperical methods for mapping and measuring qualitative symbolic orientation.

Terrell, who is with the Department of Instructional Design at Virginia Polytechnic Institute and State University, has been conducting cognitive style research and is presently redesigning a mapping instrument. Terrell's doctoral dissertation research (1974) was an examination of the modification of anxiety levels in students utilizing cognitive style matching.

Mullally, Associate Professor and Program Area Leader to Educational Media and Instructional Design, University of Florida, has designed and taught courses in the use of cognitive style mapping in instructional design. He is presently coordinating research in the Theoretical Auditory Linguistics/Theoretical Visual Linguistics area and is designing and norming a new mapping instrument.

The panel of experts worked individually - each viewed portions of the AVT slidetape package; read accompanying portions of the programmed textbook; examined the publisher-produced theory, production and final examinations; examined the course objectives, course outlines and grading scales for the various portions of the course; and designed the following Cognitive Style Maps for the theory, production, speed and accuracy portion of the AVT course and an overall AVT course map.

Theory Map

<u>Bass</u>	<u>Terrell</u>	<u>Mullally</u>
T(VL)	T(VL)	T(VL)
T(AL)	T(AL)	T(AL)
T'(VQ)	T'(VQ)	T'(VQ)
T'(AQ)	T'(AQ)	T'(AQ)
Q(V)	Q(V)	Q(V)
Q(CET)	Q(CET)	Q(CET)
Q(CS)	Q(CS)	Q(CS)
		Q'(P)
I	I	I
F'	F'	F'
M	M	M
	D'	R'

Production Map

<u>Bass</u>	<u>Terrell</u>	<u>Mullally</u>
T(VL)	T(VL)	T(VL)
T'(VQ)	T'(VQ)	T'(VQ)
T(AL)	T(AL)	T(AL)
T'(AQ)	T'(AQ)	T'(AQ)
Q(V)	Q(V)	Q(V)
Q(CET)	Q(CET)	Q(CET)
A(CS)	Q(CS)	Q(CS)
Q(P)	Q(P)	Q(P)
Q'(A)	Q'(A)	Q'(CES)
Q'(T)	Q(T)	Q(T)
Q'(CKH)	Q'(CKH)	Q'(CKH)

Production Map (continued)

I

F'

M

I

F'

M

D'

I

F'

M

R'

Speed/Accuracy MapBass

T(VL)

T'(AL)

Q(V)

Q(P)

Q(CET)

Q(CS)

Q'(CKH)

Q(T)

Q'(A)

I

F'

M

Terrell

T(VL)

T'(AL)

Q(V)

Q(P)

Q(CET)

Q(CS)

Q'(CKH)

Q(T)

Q'(A)

I

F'

M

D'

Mullally

T(VL)

T(AL)

T'(AQ)

T'(VQ)

Q(V)

Q(P)

Q(CET)

Q(CS)

Q'(CKH)

Q(T)

I

F'

M

R'

Overall AVT Course Map

<u>Bass</u>	<u>Terrell</u>	<u>Mullally</u>
T(VL)	T(VL)	T(VL)
T(AL)	T(AL)	T(AL)
T' (AQ)	T' (AQ)	T' (AQ)
T' (VQ)	T' (VQ)	T' (VQ)
Q(V)	Q(V)	Q(V)
Q(P)	Q(P)	Q(P)
Q' (T)	Q' (T)	Q(T)
Q' (A)	Q' (A)	Q' (CES)
Q(CET)	Q(CET)	Q(CET)
Q(CS)	Q(CS)	Q(CS)
Q' (CKH)	Q' (CKH)	Q' (CKH)
I	I	I
F'	F'	F'
M	M	M
	D'	R'

In order to combine the three member's of the panel of experts cognitive style maps of the course segments into one, a mathematical scoring procedure was utilized. One point was assigned to each element (major or minor orientation) in each of the individual panel member's maps. If two or more points were assigned to a particular element, it was included in the composite map for that portion of the AVT course. If less than two points were assigned to a



particular element, it was excluded from the composite map for that portion of the AVT course.

Had one panel member indicated an element as a major orientation, the second member indicated that element as a minor (') orientation, and the third member indicated that element as a negligible orientation (did not appear) - the element would have been included in the composite map as a minor orientation; this did not, however, occur.

The panel members were contacted and agreed to the above scoring procedure.

Composite Overall AVT Course Map

T(AL)	I	M
T(VL)		
T'(VQ)		
T'(AQ)		
Q(V)		
Q'(A)		
Q'(T)		
Q(P)		
Q(CET)		
Q(CS)		
Q'(CKH)		

The elements of cognitive style presented in this map are: Theoretical Auditory Linguistic, T(AL)--the AVT package would appeal to a student who performs well through hearing

the spoken word; Theoretical Visual Linguistics, T(VL)--the student who performs well by seeing the printed word; Theoretical Visual Quantitative, T'(VQ) - the student should have a minor (indicated by an apostrophe) orientation towards acquiring meaning through the visual interpretation of numerals; Theoretical Auditory Quantitative, T'(AQ)--a minor orientation in acquiring meaning through the hearing of numbers.

The Qualitative Codes (Q) indicate that the student should do well with the overall AVT package if he/she has an orientation towards perceiving meaning through Q(V)--the sense of sight; Q'(A)--the sense of hearing (minor); and Q'(T)--the sense of touch (minor). Q(P) in the first set is a qualitative code which refers to the ability to produce a natural performance of movement or "programmatically effects"; Q(CET)--Qualitative Code Ethic, a commitment to a set of values, duties or obligations; Q(CS)--Qualitative Code Synnoetics, personal knowledge of his/her abilities; and Q'(CKH)--Qualitative Code Kinesthetics, motor skill abilities.

The I--Individual and F--Family in the second set indicate that for a student to be most effective with the AVT package he/she is a self-oriented decision maker but is influenced somewhat by perceived family members.

The M--Magnitude symbol in the third set shows that the student should do best if he/she is a categorical classifier.

In the same fashion, the panel of experts described separate maps representing the separate areas of the AVT package that is examined in the study (theory, production and speed/accuracy). These appear below.

Composite AVT Theory Map

T(VL)	I	M
T'(VQ)	F'	
T(AL)		
T'(AQ)		
Q(V)		
Q(CET)		
Q(CS)		

Composite AVT Production Map

T(VL)	I	M
T'(VQ)	F'	
T(AL)		
T'(AQ)		
Q(V)		
Q'(A)		
Q(T)		
Q(CET)		
Q(CS)		
Q(P)		
Q'(CKH)		

Composite AVT Speed/Accuracy Map

T(VL)	I	M
T'(AL)		
Q(V)		
Q'(A)		
Q(T)		
Q(P)		
Q(CET)		
Q(CS)		
Q'(CKH)		

Determining Degree of Match

It is assumed that if a student's cognitive style map has all of the elements described above in the AVT map, he/she will have a perfect match with the package. This score is set at 100% - the maximum or perfect match with the AVT package. The next step is to compare the AVT map elements, in individual and binomial combinations within each set, with those of each student. Using the formula first designed by Hill and described by Hand (1972) the degree of match of each student's map to the map of the AVT package is determined.

The sample calculation of the maximum 100% score of the AVT theory package shown below is calculated by awarding two points for each symbolic element as it occurs individually and in binomial combinations.

T(VL) =	2	I = 2	M = 2
T'(VQ) =	2	F' = 2	
T(AL) =	2	I = F' = 4	
T'(AQ) =	2		
Q(V) =	2		
Q(CET) =	2		
Q(CS) =	2		
T(VL) + Q(V) =	4		
T(VL) + Q(CET) =	4		
T(VL) + Q(CS) =	4		
T'(VQ) + Q(V) =	4		
T'(VQ) + Q(CET) =	4		
T'(VQ) + Q(CS) =	4		
T(AL) + Q(V) =	4		
T(AL) + Q(CET) =	4		
T(AL) + Q(CS) =	4		
T'(AQ) + Q(V) =	4		
T'(AQ) + Q(CET) =	4		
T'(AQ) + Q(CS) =	<u>4</u>	<u>          </u>	<u>          </u>
TOTALS	62	8	2

The AVT theory map score maximum is then:

$$\frac{\frac{62}{62} + \frac{8}{8} + \frac{2}{2}}{3} = \frac{3}{3} = 1$$

To determine the relationship between the student's map and the AVT theory map a calculation is made of the numerical score of the student's map, and this is compared to that of the AVT theory map.

For each individual match between an element on the student's map and the AVT theory map two points are assigned. A minor (') orientation on one map corresponding to a major on the other is assigned one point.

The following hypothetical student's map has been abbreviated to show only those elements which appear on the AVT theory map.

<u>Student #1 (Appendix D)</u>			
T' (AQ) =	2	I = 2	M = 1
T (VL) =	2	F' = 2	
T' (VQ) =	2	I + F' = 4	
Q (CS) =	2		
Q' (V) =	1		
Q' (CET) =	1		
T' (AQ) + Q (CS) =	4		
T' (AQ) + Q' (V) =	3		
T' (AQ) + Q' (CET) =	3		
T (VL) + Q (CS) =	4		
T (VL) + Q' (V) =	3		
T (VL) + Q' (CET) =	3		
T' (VQ) + Q (CS) =	4		
T' (VQ) + Q' (V) =	3		
T' (VQ) + Q' (CET) =	<u>3</u>		
TOTAL	40	<u>8</u>	<u>1</u>

The student's score is:

$$\frac{40}{62} + \frac{8}{8} + \frac{1}{2} = .645 + 1 + .5 = \underline{.715} \text{ or } \underline{72\%} \text{ match}$$

Student cognitive style map scores were then operationally defined as being either a high match (81 - 100%), medium match (61 - 80%), or low (0 - 60%) for purposes of testing the operational hypothesis.

### Operational Hypotheses

The following operational hypotheses were generated in order to answer the basic questions of the study.

1. Students exhibiting a high degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting theory than those exhibiting a low degree of match.
2. Students exhibiting a high degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting theory than those exhibiting a medium degree of match.
3. Students exhibiting a medium degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting theory than those exhibiting a low degree of match.
4. Students exhibiting a high degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting production than those exhibiting a low degree of match.
5. Students exhibiting a high degree of match between their cognitive style and that of the AVT package will do

significantly better on scores of achievement in typewriting production than those exhibiting a medium degree of match.

6. Students exhibiting a medium degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting production than those exhibiting a low degree of match.

7. Students exhibiting a high degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting speed and accuracy than those exhibiting a low degree of match.

8. Students exhibiting a high degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting speed and accuracy than those exhibiting a medium degree of match.

9. Students exhibiting a medium degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting speed and accuracy than those exhibiting a low degree of match.

10. Students exhibiting a high degree of match between their cognitive style and that of the overall AVT package will do significantly better as measured by the final grades in the typewriting course than will students exhibiting a low degree of match.

11. Students exhibiting a high degree of match between



their cognitive style and that of the overall AVT package will do significantly better as measured by the final grades in the typewriting course than will students exhibiting a medium degree of match.

12. Students exhibiting a medium degree of match between their cognitive style and that of the overall AVT package will do significantly better as measured by the final grades in the typewriting course than will students exhibiting a low degree of match.

In order to answer the questions posed in Chapter I of the study and to decide whether to accept or reject a corresponding operational hypothesis the operational hypothesis must be converted to equivalent statistical hypothesis. The operational hypothesis is converted to a simple mathematical statement known as the statistical alternative hypothesis ( $H_a$ ). For example, operational hypothesis number 11, "Students exhibiting a high degree of match between their cognitive style and that of the overall AVT package will do significantly better as measured by the final grades in the typewriting course than will students exhibiting a medium degree of match," will be converted to the statistical alternative hypothesis:

$$H_{a11}: OF_h > OF_m$$

O stands for the overall grades,  $F_h$  stands for the relative cumulative frequency of the students in the high

match category, and Fm stands for students in the medium match category.

After the statistical alternative has been stated its opposite, the null hypothesis ( $H_0$ ), is formulated.

$$H_{011}: OFh \leq OFm$$

It is the null hypothesis which will be tested using the Kolmogorov-Smirnov two-sample test.

The 12 statistical null and alternative hypothesis corresponding to the above operational hypothesis will be generated in Chapter IV.

#### Analytic Technique

The cognitive style maps of the students within the sample were compared to the theoretical cognitive style map for the AVT package, and a degree of match was determined. Student performance was then analyzed in terms of the relationship of that degree of match and their grades in typing theory, production, speed and accuracy, and in the overall course using the two-sample Kolmogorov-Smirnov statistical test method. The Kolmogorov-Smirnov two-sample test is a non-parametric test that was chosen because it is especially useful and powerful with small samples. Violations of the assumptions of the shape or variance of the population scores underlying the parametric tests are very likely to go undetected with small samples. (Kerlinger, 1973, p. 296)

Kolmogorov-Smirnov two-sample test is used to determine whether two populations are distributed in the same fashion. Its use requires data at least on an ordinal scale, and the assumption is made that the data are continually distributed. (Roscoe, 1975, p. 276)

The level of significance selected for rejecting the null hypotheses was at the .05 Alpha level.

An example of the method used is presented below, using a hypothetical score distribution and the statistical null hypotheses number 11 stated above ( $H_{011}: OF_h \leq OF_m$ ).

OVERALL AVT COURSE GRADES					
MATCH GROUP	A	B	C	D	n
HIGH (81-100%)	$\frac{2}{3} = \frac{16}{24}$	$\frac{1}{3} = \frac{24}{24}$	$\frac{0}{3} = \frac{24}{24}$	$\frac{0}{3} = \frac{24}{24}$	3
MEDIUM (61-80%)	$\frac{1}{8} = \frac{3}{24}$	$\frac{3}{8} = \frac{12}{24}$	$\frac{2}{8} = \frac{18}{24}$	$\frac{2}{8} = \frac{24}{24}$	8
GROUP DIFFERENCES	$\frac{13^*}{24}$	$\frac{12}{24}$	$\frac{6}{24}$	$\frac{0}{24}$	

In this hypothetical distribution of student scores the two horizontal rows represent the students' degree of match with the AVT package. The vertical columns represent the students' grades in the course. The grades range from A to D with the letter A being the highest grade. The number two in

the upper left corner of the high match/A grade block indicates that two subjects who scored a high match with the map for AVT theory package received final theory grades of 'A'. One high match received a 'B', no one received a 'C', and no one received a grade of 'D'. The three in the high match 'n' block indicates that there was a total of three students in the high match category.

The fraction  $2/3$  in the high match/Z block - and the corresponding  $16/24$  (24 being the lowest common denominator for the high and medium match group) - represents the cumulative distribution (adding from left to right) - showing that two out of three high match students were in this block. The fraction  $3/3$  in the high match/B block - and the corresponding  $24/24$  - represents the cumulative distribution - showing that three students have received A's and B's in the high match row.

In the row labeled "medium" match there are eight observed scores distributed as one, three, two and two among the four theory grade categories. These frequencies are then converted to cumulative fractions and the absolute group difference between the high match and medium match row is determined and shown in the bottom row of the table. The largest absolute difference ( $13/24$ ) is marked with an asterisk. This figure is then compared with a table (Appendix H) figure for the critical values of the Kolmogorov-Smirnov one tail test at .05 Alpha to determine if the absolute difference is significant.

The table, modified from Pearson and Hartley (1972, p. 361) is utilized to determine the value of  $c$  in:

$$\Pr[D_{m,n} \geq c/mn] \leq \alpha \quad (\text{Pearson and Hartley, 1972, p. 122})$$

Where  $\Pr$  represents the probability of occurrence;  $D$  is the maximum absolute difference between two distributions; and  $m$  and  $n$  are the sample sizes of the two groups being tested.

Therefore, in our example above, with group sizes of  $m = \text{three}$  and  $n = \text{eight}$ , three and eight would be multiplied together to form the denominator 24 of our test fraction. The numerator  $c$  of the test statistics determined from the table of critical values (Appendix H) would be 21. Comparing the observed absolute difference of  $13/24$  to the critical value of  $21/24$  and finding it to be less the test results indicate that no significant difference exists between the high and medium matched group grades and the null hypothesis being tested ( $H_{011}: OF_h \leq OF_m$ ) cannot be rejected.

It should be noted that in certain cases the number of subjects in a particular cell may be too small ( $n$  size) to be tested at a confidence level of .05 due to the conservative nature of Kolmogorov-Smirnov statistic (Appendix H).

### Summary

A Cognitive Style Mapping Inventory was administered to students enrolled in Beginning Typewriting I at Tompkins

Cortland Community College in Dryden, New York. The degree of match between each student's map and a theoretical map established for the AVT typewriting package was determined. Each student then proceeded through the AVT typewriting course, and records of their attendance and performance were maintained.

At the end of the course a comparison was made between the students' degree of match with the AVT package and their typewriting production, theory, speed, and overall course grades to determine if any significant relationship existed. Twelve operational hypotheses were generated to answer the basic questions of the study. The data were analyzed by the Kolmogorov-Smirnov two-sample statistical test of significance.

## CHAPTER IV

### ANALYSIS OF DATA

An analysis of the data is reported in this chapter. The hypotheses are reviewed and subjected to statistical testing in the order of presentation in the previous chapter. The appropriate test results are reported.

Symbols utilized to present the hypothetical statements are defined below:

Table 4-1. Description of Statistical Symbols

Symbol	Description
$H_o$	Null Hypothesis
$H_a$	Alternative Hypothesis
Fh	High matched students-cumulative frequency (81-100%)
Fm	Medium matched students-cumulative frequency (61-80%)
Fl	Low match students-cumulative frequency (0-60%)
T	Students matched with Typing Theory Map
P	Students matched with Typing Production Map
S	Students matched with Typing Speed/Accuracy Map
O	Students matched with Overall AVT Map Testing-final course grade

Data collected on each student is presented in Table 4-2. The data collected were used in compiling the information for the Kolmogorov-Smirnov two-sample nonparametric test. The level of significance for the one-tailed test was established at .05 Alpha.

Table 4-2. Raw Data

Student #	Theory Match	Theory Grade	Prod. Match	Prod. Grade	Speed Accuracy Match	Speed Accuracy Grade	Overall Match	Final Course Grade
1	72	A-	72	B-	66	NC	71	C+
2	85	B+	83	B+	85	B-	80	B+
3	60	B	58	C-	60	C	59	C
4	58	-	65	-	66	-	64	NP
5	76	B+*	76	C-	76	X	76	C+
6	57	A-*	59	A	55	X	58	A
7	82	A-*	84	A-	84	X	82	B+
8	80	B*	78	B+	74	X	79	A-
9	57	-	59	-	63	-	58	NP
10	69	-	72	-	76	-	70	NP
11	59	B-	60	C+	67	B	60	B-
12	65	A	67	B+	71	B	66	A-
13	68	-	67	-	67	-	66	NP
14	80	B+	81	A-	82	A	80	A
15	69	C	71	C	70	NC	70	D
16	62	C-*	70	B+	70	X	69	B-
17	68	B	67	C+	67	A	66	B-

\*Average of last three theory grades.



Of the population of 17 students, five were excluded from the first ten lessons as indicated by the students' pretest results. These students' theory test scores were based on an average of three tests of theory rather than four as the first theory test is based upon information contained in the first ten lessons. (Operational Hypotheses 1-3). For the same reason, the grades of these five students will be eliminated from the speed and accuracy grade analysis (Operational Hypotheses 7-9).

Two of the remaining students received no credit for the speed/accuracy portion of the course and will not be included in that portion of the analysis.

Of the population of 17 students, four did not complete the course and will be included only in the portions of the analysis measuring the overall grade in the course (Operational Hypotheses 10-12).

### Findings of the Study

Operational Hypothesis 1. Students exhibiting a high degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting theory than those exhibiting a low degree of match.

Statistical Hypothesis 1.

Null Hypothesis  $H_{01}$ :  $TFh \leq TF1$

Alternate Hypothesis  $H_{a1}$ :  $TFh > TF1$

Table 4-3. Kolmogorov-Smirnov Test Between High and Low Degree of Match Groups and AVT Theory Test Grades.

#### AVT GRADES - Theory Tests

Match Group	A	B	C	D	n
TFh (81-100%)	$1 \frac{1}{2} = \frac{3}{6}$	$1 \frac{2}{2} = \frac{6}{6}$	$0 \frac{2}{2} = \frac{6}{6}$	$0 \frac{2}{2} = \frac{6}{6}$	2
TF1 (0-60%)	$1 \frac{1}{3} = \frac{2}{6}$	$2 \frac{3}{3} = \frac{6}{6}$	$0 \frac{3}{3} = \frac{6}{6}$	$0 \frac{3}{3} = \frac{6}{6}$	3
Group Difference	$\frac{1^*}{6}$	$\frac{0}{6}$	$\frac{0}{6}$	$\frac{0}{6}$	

The largest absolute difference in Table 4-3 is  $1/6$ .

According to the Kolmogorov-Smirnov Table of critical values (Appendix H) this value indicates that no significant difference exists between the two distributions being compared. The null hypothesis  $TFh \leq TF1$  cannot be rejected and the alternate hypothesis  $TFh > TF1$  cannot be accepted. Therefore, Operational Hypothesis 1 cannot be accepted.

Operational Hypothesis 2. Students exhibiting a high degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in type-writing theory than those exhibiting a medium degree of match.

Statistical Hypothesis 2.

Null Hypothesis  $H_{02}$ :  $TFh \leq TFm$

Alternate Hypothesis  $H_{a2}$ :  $TFh > TFm$

Table 4-4. Kolmogorov-Smirnov Test Between High and Medium Degree of Match Groups and AVT Theory Test Grades.

AVT GRADES - Theory Tests					
Match Group	A	B	C	D	n
TFh (81-100%)	$\frac{1}{2} = \frac{4}{8}$	$\frac{2}{2} = \frac{8}{8}$	$\frac{2}{2} = \frac{8}{8}$	$\frac{2}{2} = \frac{8}{8}$	2
TFm (61-80%)	$\frac{2}{8} = \frac{2}{8}$	$\frac{6}{8} = \frac{6}{8}$	$\frac{8}{8} = \frac{8}{8}$	$\frac{8}{8} = \frac{8}{8}$	8
Group Difference	$\frac{2^*}{8}$	$\frac{2}{8}$	$\frac{0}{8}$	$\frac{0}{8}$	

The largest absolute difference in Table 4-4 is  $2/8$ . According to the Kolmogorov-Smirnov Table of critical values (Appendix H) this value indicates that no significant difference exists between the two distributions being compared. The null hypothesis  $TFh \leq TFm$  cannot be rejected and the alternate hypothesis  $TFh > TFm$  cannot be accepted. Therefore, Operational Hypothesis 2 cannot be accepted.

Operational Hypothesis 3. Students exhibiting a medium degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting theory than those exhibiting a low degree of match.

Statistical Hypothesis 3.

Null Hypothesis  $H_{03}$ :  $TF_m \leq TF_l$

Alternate Hypothesis  $H_{a3}$ :  $TF_m > TF_l$

Table 4-5. Kolmogorov-Smirnov Test Between Medium and Low Degree of Match Groups and AVT Theory Test Grades.

AVT GRADES - Theory Tests

Match Group	A	B	C	D	n
TF <sub>m</sub> (61-80%)	2 $\frac{2}{8} = \frac{6}{24}$	4 $\frac{6}{8} = \frac{18}{24}$	2 $\frac{8}{8} = \frac{24}{24}$	0 $\frac{3}{3} = \frac{24}{24}$	8
TF <sub>l</sub> (0-61%)	1 $\frac{1}{3} = \frac{8}{24}$	2 $\frac{3}{3} = \frac{24}{24}$	0 $\frac{3}{3} = \frac{24}{24}$	0 $\frac{3}{3} = \frac{24}{24}$	3
Group Difference	$\frac{2}{24}$	$\frac{6^*}{24}$	$\frac{0}{24}$	$\frac{0}{24}$	

The largest absolute difference in Table 4-5 is 6/24.

According to the Kolmogorov-Smirnov Table of critical values (Appendix H) this value indicates that no significant difference exists between the two distributions being compared. The null hypothesis  $TF_m \leq TF_l$  cannot be rejected and the alternate hypothesis  $TF_m > TF_l$  cannot be accepted. Therefore, Operational Hypothesis 3 cannot be accepted.

Operational Hypothesis 4. Students exhibiting a high degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in type-writing production than those exhibiting a low degree of match.

Statistical Hypothesis 4.

Null Hypothesis  $H_{04}$ :  $PFh \leq PF1$

Alternative Hypothesis  $H_{a4}$ :  $PFh > PF1$

Table 4-6. Kolmogorov-Smirnov Test Between High and Low Degree of Match Groups and AVT Production Test Grades.

AVT GRADES - Production Tests

Match Group	A	B	C	D	n
PFh (81-100%)	2 $\frac{2}{3}$	1 $\frac{3}{3}$	0 $\frac{3}{3}$	0 $\frac{3}{3}$	3
PF1 (0-60%)	1 $\frac{1}{3}$	0 $\frac{1}{3}$	2 $\frac{3}{3}$	0 $\frac{3}{3}$	3
Group Differ- ence	$\frac{1}{3}$	$\frac{2^*}{3}$	$\frac{0}{3}$	$\frac{0}{3}$	

The largest absolute difference in Table 4-6 is  $2/3$ . According to the Kolmogorov-Smirnov Table of critical values (Appendix H) this value indicates that no significant difference exists between the two distributions being compared. The null hypothesis  $PFh \leq PF1$  cannot be rejected and the alternate hypothesis  $PFh > PF1$  cannot be accepted. Therefore, Operational Hypothesis 4 cannot be accepted.

Operational Hypothesis 5. Students exhibiting a high degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting production than those exhibiting a medium degree of match.

Statistical Hypothesis 5.

Null Hypothesis  $H_{05}$ :  $PFh \leq PFm$

Alternate Hypothesis  $H_{a5}$ :  $PFh > PFm$

Table 4-7. Kolmogorov-Smirnov Test Between High and Medium Degree of Match Groups and AVT Production Test Grades.

AVT GRADES - Production Tests

Match Group	A	B	C	D	n
PFh (81-100%)	2 $\frac{2}{3} = \frac{14}{21}$	1 $\frac{3}{3} = \frac{21}{21}$	0 $\frac{3}{3} = \frac{21}{21}$	0 $\frac{3}{3} = \frac{21}{21}$	3
PFm (61-80%)	0 $\frac{0}{7} = \frac{0}{21}$	4 $\frac{4}{7} = \frac{12}{21}$	3 $\frac{7}{7} = \frac{21}{21}$	0 $\frac{7}{7} = \frac{21}{21}$	7
Group Difference	$\frac{14^*}{21}$	$\frac{9}{21}$	$\frac{0}{21}$	$\frac{0}{21}$	

The largest absolute difference in Table 4-7 is 14/21. According to the Kolmogorov-Smirnov Table of critical values (Appendix H) this value indicates that no significant difference exists between the two distributions being compared. The null hypothesis  $PFh \leq PFm$  cannot be rejected and the alternate hypothesis  $PFh > PFm$  cannot be rejected. Therefore, Operational Hypothesis 5 cannot be accepted.

Operational Hypothesis 6. Students exhibiting a medium degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting production than those exhibiting a low degree of match.

Statistical Hypothesis 6.

Null Hypothesis  $H_{06}$ :  $PF_m \leq PF_l$

Alternate Hypothesis  $H_{a6}$ :  $PF_m > PF_l$

Table 4-8. Kolmogorov-Smirnov Test Between Medium and Low Degree of Match Groups and AVT Production Test Grades.

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AVT GRADES - Production Tests

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Match Group	A	B	C	D	n
PF <sub>m</sub> (61-80%)	<sup>0</sup> $\frac{0}{7} = \frac{0}{21}$	<sup>4</sup> $\frac{4}{7} = \frac{12}{21}$	<sup>3</sup> $\frac{7}{7} = \frac{21}{21}$	<sup>0</sup> $\frac{7}{7} = \frac{21}{21}$	7
PF <sub>l</sub> (0-60%)	<sup>1</sup> $\frac{1}{3} = \frac{7}{21}$	<sup>0</sup> $\frac{1}{3} = \frac{7}{21}$	<sup>2</sup> $\frac{3}{3} = \frac{21}{21}$	<sup>0</sup> $\frac{3}{3} = \frac{21}{21}$	3
Group Difference	$\frac{7^*}{21}$	$\frac{5}{21}$	$\frac{0}{21}$	$\frac{0}{21}$	

The largest absolute difference in Table 4-8 is 7/21.

According to the Kolmogorov-Smirnov Table of critical values (Appendix H) this value indicates that no significant difference exists between the two distributions being compared. The null hypothesis  $PF_m \leq PF_l$  cannot be rejected and the alternate hypothesis  $PF_m > PF_l$  cannot be accepted. Therefore, Operational Hypothesis 6 cannot be accepted.

Operational Hypothesis 7. Students exhibiting a high degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in type-writing speed and accuracy than those exhibiting a low degree of match.

Statistical Hypothesis 7.

Null Hypothesis  $H_{07}$ :  $SF_h \leq SF_l$

Alternate Hypothesis  $H_{a7}$ :  $SF_h > SF_l$

Table 4-9. Kolmogorov-Smirnov Test Between High and Low Degree of Match Groups and AVT Speed and Accuracy Test Grades.

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AVT GRADES - Speed and Accuracy Tests

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Match Group	A	B	C	D	n
SF <sub>h</sub> (81-100%)	$\frac{1}{2} = \frac{1}{2}$	$\frac{2}{2} = \frac{2}{2}$	$\frac{0}{2} = \frac{2}{2}$	$\frac{0}{2} = \frac{2}{2}$	2
SF <sub>l</sub> (0-60%)	$\frac{0}{1} = \frac{0}{2}$	$\frac{0}{1} = \frac{0}{2}$	$\frac{1}{1} = \frac{2}{2}$	$\frac{0}{2} = \frac{2}{2}$	1
Group Difference	$\frac{1}{2}$	$\frac{2^*}{2}$	$\frac{0}{2}$	$\frac{0}{2}$	

The largest absolute difference in Table 4-9 is  $\frac{2}{2}$ . According to the Kolmogorov-Smirnov Table of critical values (Appendix H) this value indicates that no significant difference exists between the two distributions being compared. The null hypothesis  $SF_h \leq SF_l$  cannot be rejected and the alternate hypothesis  $SF_h > SF_l$  cannot be accepted. Therefore, Operational Hypothesis 7 cannot be accepted.



Operational Hypothesis 8. Students exhibiting a high degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in type-writing speed and accuracy than those exhibiting a medium degree of match.

Statistical Hypothesis 8.

Null Hypothesis  $H_{08}$ :  $SFh \leq SFm$

Alternate Hypothesis  $H_{a8}$ :  $SFh > SFm$

Table 4-10. Kolmogorov-Smirnov Test Between High and Medium Degree of Match Groups and AVT Speed and Accuracy Test Grades.

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AVT GRADES - Speed and Accuracy Tests

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Match Group	A	B	C	D	n
SFh (81-100%)	$1 \frac{1}{2} = \frac{3}{6}$	$1 \frac{2}{2} = \frac{6}{6}$	$0 \frac{2}{2} = \frac{6}{6}$	$0 \frac{2}{2} = \frac{6}{6}$	2
SFm (61-80%)	$1 \frac{1}{3} = \frac{2}{6}$	$2 \frac{3}{3} = \frac{6}{6}$	$0 \frac{3}{3} = \frac{6}{6}$	$0 \frac{3}{3} = \frac{6}{6}$	3
Group Difference	$\frac{1^*}{6}$	$\frac{0}{6}$	$\frac{0}{6}$	$\frac{0}{6}$	

The largest absolute difference in Table 4-10 is  $1/6$ .

According to the Kolmogorov-Smirnov Table of critical values (Appendix H) this value indicates that no significant difference exists between the two distributions being compared. The null hypothesis  $SFh \leq SFm$  cannot be rejected and the alternate hypothesis  $SFh > SFm$  cannot be accepted. Therefore, Operational Hypothesis 8 cannot be accepted.

Operational Hypothesis 9. Students exhibiting a medium degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting speed and accuracy than those exhibiting a low degree of match.

Statistical Hypothesis 9.

Null Hypothesis  $H_{09}$ :  $SF_m \leq SF_l$

Alternate Hypothesis  $H_{a9}$ :  $SF_m > SF_l$

Table 4-11. Kolmogorov-Smirnov Test Between Medium and Low Degree of Match Groups and AVT Speed and Accuracy Test Grades.

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AVT GRADES - Speed and Accuracy Tests

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Match Group	A	B	C	D	n
SF <sub>m</sub> (61-80%)	1 $\frac{1}{3}$	2 $\frac{3}{3}$	0 $\frac{3}{3}$	0 $\frac{3}{3}$	3
SF <sub>l</sub> (0-60%)	0 $\frac{0}{1} = \frac{0}{3}$	0 $\frac{0}{1} = \frac{0}{3}$	1 $\frac{1}{1} = \frac{3}{3}$	0 $\frac{1}{1} = \frac{3}{3}$	1
Group Difference	$\frac{1}{3}$	$\frac{3^*}{3}$	$\frac{0}{3}$	$\frac{0}{3}$	

The largest absolute difference in Table 4-11 is  $3/3$ .

According to the Kolmogorov-Smirnov Table of critical values (Appendix H) this value indicates that no significant difference exists between the two distributions being compared. The null hypothesis  $SF_m \leq SF_l$  cannot be rejected and the alternate hypothesis  $SF_m > SF_l$  cannot be accepted. Therefore, Operational Hypothesis 9 cannot be accepted.

Operational Hypothesis 10. Students exhibiting a high degree of match between their cognitive style and that of the overall AVT package will do significantly better as measured by the final grade in the typewriting course than will students exhibiting a low degree of match.

Statistical Hypothesis 10.

Null Hypothesis  $H_{010}$ :  $OF_h \leq OF_l$

Alternate Hypothesis  $H_{a10}$ :  $OF_h > OF_l$

Table 4-12. Kolmogorov-Smirnov Test Between High and Low Degree of Match Groups and AVT Overall Course Grades.

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AVT GRADES - Overall Course

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Match Group	A	B	C	D	n
OF <sub>h</sub> (81-100%)	$\frac{0}{1} = \frac{0}{3}$	$\frac{1}{1} = \frac{3}{3}$	$\frac{1}{1} = \frac{3}{3}$	$\frac{1}{1} = \frac{3}{3}$	1
OF <sub>l</sub> (0-60%)	$\frac{1}{3} = \frac{1}{3}$	$\frac{2}{3} = \frac{2}{3}$	$\frac{3}{3} = \frac{3}{3}$	$\frac{3}{3} = \frac{3}{3}$	3
Group Difference	$\frac{1^*}{3}$	$\frac{1}{3}$	$\frac{0}{3}$	$\frac{0}{3}$	

The largest absolute difference in Table 4-12 is  $1/3$ . According to the Kolmogorov-Smirnov Table of critical values (Appendix H) this value indicates that no significant difference exists between the two distributions being compared. The null hypothesis  $OF_h \leq OF_l$  cannot be rejected and the alternate hypothesis  $OF_h > OF_l$  cannot be accepted. Therefore, Operational Hypothesis 10 cannot be accepted.

Operational Hypothesis 11. Students exhibiting a high degree of match between their cognitive style and that of the overall AVT package will do significantly better as measured by the final grade in the typewriting course than will students exhibiting a medium degree of match.

Statistical Hypothesis 11.

Null Hypothesis  $H_{011}$ :  $OFh \leq OFm$

Alternate Hypothesis  $H_{a11}$ :  $OFh > OFm$

Table 4-13. Kolmogorov-Smirnov Test Between High and Medium Degree of Match Groups and AVT Overall Course Grades.

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AVT GRADES - Overall Course

Match Group	A	B	C	D	n
OFh (81-100%)	$\frac{0}{1} = \frac{0}{9}$	$\frac{1}{1} = \frac{9}{9}$	$\frac{1}{1} = \frac{9}{9}$	$\frac{1}{1} = \frac{9}{9}$	1
OFm (61-80%)	$\frac{3}{9} = \frac{3}{9}$	$\frac{6}{9} = \frac{6}{9}$	$\frac{8}{9} = \frac{8}{9}$	$\frac{9}{9} = \frac{9}{9}$	9
Group Difference	$\frac{3^*}{9}$	$\frac{3}{9}$	$\frac{1}{9}$	$\frac{0}{9}$	

The largest absolute difference in Table 4-13 is 3/9. According to the Kolmogorov-Smirnov Table of critical values (Appendix H) this value indicates that no significant difference exists between the two distributions being compared. The null hypothesis  $OFh \leq OFm$  cannot be rejected and the alternate hypothesis  $OFh > OFm$  cannot be accepted. Therefore, Operational Hypothesis 11 cannot be accepted.

Operational Hypothesis 12. Students exhibiting a medium degree of match between their cognitive style and that of the overall AVT package will do significantly better as measured by the final grade in the typewriting course than will students exhibiting a low degree of match.

Statistical Hypothesis 12.

Null Hypothesis  $H_{012}$ :  $OF_m \leq OF_l$

Alternate Hypothesis  $H_{a12}$ :  $OF_m > OF_l$

Table 4-14. Kolmogorov-Smirnov Test Between Medium and Low Degree of Match Groups and AVT Overall Course Grades.

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AVT GRADES - Overall Course

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Match Group	A	B	C	D	n
OF <sub>m</sub> (61-80%)	3 $\frac{3}{9}$	3 $\frac{6}{9}$	2 $\frac{8}{9}$	1 $\frac{9}{9}$	9
OF <sub>l</sub> (0-60%)	1 $\frac{1}{3} = \frac{3}{9}$	1 $\frac{2}{3} = \frac{6}{9}$	1 $\frac{3}{3} = \frac{9}{9}$	0 $\frac{3}{3} = \frac{9}{9}$	3
Group Difference	0 $\frac{0}{9}$	0 $\frac{0}{9}$	1* $\frac{1}{9}$	0 $\frac{0}{9}$	

The largest absolute difference in Table 4-14 is 1/9. According to the Kolmogorov-Smirnov Table of critical values (Appendix H) this value indicates that no significant difference exists between the two distributions being compared. The null hypothesis  $OF_m \leq OF_l$  cannot be rejected and the alternate hypothesis  $OF_m > OF_l$  cannot be accepted. Therefore, Operational Hypothesis 12 cannot be accepted.

### Additional Analysis

The relationship in terms of the degree of match between the students' maps and the overall grades in the AVT course will also be analyzed, including the four students who did not complete the course and received no credit for it. For purposes of this analysis three additional operational hypotheses will be generated as well as their corresponding statistical null and alternate hypothesis.

The grade NP, or not-pass, will be utilized as part of the Kolmogorov-Smirnov testing procedure.

Operational Hypothesis 10 A.

Students (including NP students) exhibiting a high degree of match between their cognitive style and that of the overall AVT package will do significantly better as measured by the final grades in the typewriting course than will students exhibiting a low degree of match.

Statistical Hypothesis 10 A.

Null Hypothesis  $H_{o10A}$ :  $OFh \leq OFl$

Alternate Hypothesis  $H_{a10A}$ :  $OFh > OFl$

Table 4-15. Kolmogorov-Smirnov Test Between High and Low Degree of Match Groups and AVT Overall Course Grades (Including NP).

AVT GRADES - Overall Course (Including NP)						
Match Group	A	B	C	D	NP	n
OFh (81-100%)	$\frac{0}{1} = \frac{0}{4}$	$\frac{1}{1} = \frac{4}{4}$	$\frac{1}{1} = \frac{4}{4}$	$\frac{1}{1} = \frac{4}{4}$	$\frac{1}{1} = \frac{4}{4}$	1
OFl (0-60%)	$\frac{1}{4}$	$\frac{2}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{4}{4}$	4
Group Difference	$\frac{1}{4}$	$\frac{2^*}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{0}{4}$	

The largest absolute difference in Table 4-15 is  $2/4$ .

According to the Kolmogorov-Smirnov Table of critical values (Appendix H) this value indicates that no significant difference exists between the two distributions being compared. The null hypothesis  $OFh \leq OFl$  cannot be rejected and the alternate hypothesis  $OFh > OFl$  cannot be accepted. Therefore, Operational Hypothesis 10 A cannot be accepted.

Operational Hypothesis 11 A.

Students (including NP students) exhibiting a high degree of match between their cognitive style and that of the overall AVT package will do significantly better as measured by the final grade in the typewriting course than will students exhibiting a medium degree of match.

Statistical Hypothesis 11 A.

Null Hypothesis  $H_{011A}$ :  $OFh \leq OFm$

Alternate Hypothesis  $H_{a11A}$ :  $OFh > OFm$

Table 4-16. Kolmogorov-Smirnov Test Between High and Medium Degree of Match Groups and AVT Overall Course Grades (Including NP).

AVT GRADES - Overall Course (Including NP)						
Match Group	A	B	C	D	NP	n
OFh (81-100%)	$\frac{0}{1} = \frac{0}{12}$	$\frac{1}{1} = \frac{12}{12}$	$\frac{1}{1} = \frac{12}{12}$	$\frac{1}{1} = \frac{12}{12}$	$\frac{1}{1} = \frac{12}{12}$	1
OFm (61-80%)	$\frac{3}{12}$	$\frac{6}{12}$	$\frac{8}{12}$	$\frac{9}{12}$	$\frac{12}{12}$	12
Group Difference	$\frac{3}{12}$	$\frac{6^*}{12}$	$\frac{4}{12}$	$\frac{3}{12}$	$\frac{0}{12}$	

The largest absolute difference in Table 4-16 is 6/12. According to the Kolmogorov-Smirnov Table of critical values (Appendix H) this value indicates that no significant difference exists between the two distributions being compared. The null hypothesis  $OFh \leq OFm$  cannot be rejected and the alternate hypothesis  $OFh > OFm$  cannot be accepted. Therefore, Operational Hypothesis 11 A cannot be accepted.



Operational Hypothesis 12 A.

Students (including NP students) exhibiting a medium degree of match between their cognitive style and that of the overall AVT package will do significantly better as measured by the final grade in the typewriting course than will students exhibiting a low degree of match.

Statistical Hypothesis 12 A.

Null Hypothesis  $H_{012A}$ :  $OF_m \leq OF_l$

Alternate Hypothesis  $H_{a12A}$ :  $OF_m > OF_l$

Table 4-17. Kolmogorov-Smirnov Test Between Medium and Low Degree of Match Groups and AVT Overall Course Grades (Including NP).

AVT GRADES - Overall Course (Including NP)						
Match Group	A	B	C	D	NP	n
OF <sub>m</sub> (61-80%)	3 $\frac{3}{12}$	3 $\frac{6}{12}$	2 $\frac{8}{12}$	1 $\frac{9}{12}$	3 $\frac{12}{12}$	12
OF <sub>l</sub> (0-60%)	1 $\frac{1}{4} = \frac{3}{12}$	1 $\frac{2}{4} = \frac{6}{12}$	1 $\frac{3}{4} = \frac{9}{12}$	0 $\frac{3}{4} = \frac{9}{12}$	1 $\frac{4}{4} = \frac{12}{12}$	4
Group Difference	$\frac{0}{12}$	$\frac{0}{12}$	$\frac{1^*}{12}$	$\frac{0}{12}$	$\frac{0}{12}$	

The largest absolute difference in Table 4-17 is  $1/12$ . According to the Kolmogorov-Smirnov Table of critical values (Appendix H) this value indicates that no significant difference exists between the two distributions being compared. The null hypothesis  $OF_m \leq OF_l$  cannot be rejected and the alternate hypothesis  $OF_m > OF_l$  cannot be accepted. Therefore, Operational Hypothesis 12 A cannot be accepted.

### Summary

Fifteen null hypotheses were generated and tested. Each null hypothesis was tested using the Kolmogorov-Smirnov two-sample test. All hypotheses were tested at the .05 level of significance. Three hypotheses were formulated dealing with the scores students achieved in typewriting theory. Three hypotheses were formulated dealing with the scores students achieved in typewriting production. Three hypotheses were formulated dealing with the scores students achieved in typewriting speed and accuracy. Three hypotheses were formulated dealing with the overall grades students achieved in the typewriting course. The final three hypotheses were formulated dealing with the overall grades students received in the course - including the students who received no credit for taking the course. A summary of the results is presented in Tables 4-18, 4-19, 4-20, 4-21, and 4-22.

Table 4-18. Summary of Results - Students' Achievement in Typewriting Theory

Operational Hypothesis	Results of Statistical Tests
<p>1. Students exhibiting a high degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting theory than those exhibiting a low degree of match.</p>	<p>Null not rejected</p>
<p>2. Students exhibiting a high degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting theory than those exhibiting a medium degree of match.</p>	<p>Null not rejected</p>
<p>3. Students exhibiting a medium degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting theory than those exhibiting a low degree of match.</p>	<p>Null not rejected</p>

Table 4-19. Summary of Results - Students' Achievement in Typewriting Production

Operational Hypothesis	Results of Statistical Tests
<p>4. Students exhibiting a high degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting production than those exhibiting a low degree of match.</p>	<p>Null not rejected</p>
<p>5. Students exhibiting a high degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting production than those exhibiting a medium degree of match.</p>	<p>Null not rejected</p>
<p>6. Students exhibiting a medium degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting production than those exhibiting a low degree of match.</p>	<p>Null not rejected</p>

Table 4-20. Summary of Results - Students' Achievement in Typewriting Speed and Accuracy

Operational Hypothesis	Results of Statistical Tests
7. Students exhibiting a high degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting speed and accuracy than those exhibiting a low degree of match.	Null not rejected
8. Students exhibiting a high degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting speed and accuracy than those exhibiting a medium degree of match.	Null not rejected
9. Students exhibiting a medium degree of match between their cognitive style and that of the AVT package will do significantly better on scores of achievement in typewriting speed and accuracy than those exhibiting a low degree of match.	Null not rejected

Table 4-21. Summary of Results - Overall Course Grade

Operational Hypothesis	Results of Statistical Tests
10. Students exhibiting a high degree of match between their cognitive style and that of the overall AVT package will do significantly better as measured by the final grade in the typewriting course than will students exhibiting a low degree of match.	Null not rejected
11. Students exhibiting a high degree of match between their cognitive style and that of the overall AVT package will do significantly better as measured by the final grade in the typewriting course than will students exhibiting a medium degree of match.	Null not rejected
12. Students exhibiting a medium degree of match between their cognitive style and that of the overall AVT package will do significantly better as measured by the final grade in the typewriting course than will students exhibiting a low degree of match.	Null not rejected

Table 4-22. Summary of Results - Overall Course Grade  
(Including NP Students)

Operational Hypothesis	Results of Statistical Tests
<p>10A. Students (including NP students) exhibiting a high degree of match between their cognitive style and that of the overall AVT package will do significantly better as measured by the final grades in the typewriting course than will students exhibiting a low degree of match.</p>	<p>Null not rejected</p>
<p>11A. Students (including NP students) exhibiting a high degree of match between their cognitive style and that of the overall AVT package will do significantly better as measured by the final grades in the typewriting course than will students exhibiting a medium degree of match.</p>	<p>Null not rejected</p>
<p>12A. Students (including NP students) exhibiting a medium degree of match between their cognitive style and that of the overall AVT package will do significantly better as measured by the final grades in the typewriting course than will students exhibiting a low degree of match.</p>	<p>Null not rejected</p>

## CHAPTER V

### SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

The purpose of this study was to determine if the degree of match between an individual student's cognitive style and a theoretical cognitive style established by a panel of experts for an audiovisual-tutorial typewriting package is an indicator of the degree of success which that student would achieve through interaction with the package.

#### Summary

The literature review has indicated that there is a need to aid educators in their approach to instruction. This need has become increasingly evident in community colleges where there is a large amount of variance in the learning ability of students. One of the ways instructors are reacting to this dilemma is by turning to various approaches to individualized instruction, but with mixed successes. The studies cited herein indicate that much research has been conducted within the framework of the Educational Science of Cognitive Style as a basis for the individualization of instruction.

The present study was undertaken within the conceptual framework of the Educational Science of Cognitive Style in an attempt to assess whether or not a relationship exists



between a student's cognitive style and successful learning in that student via a specific individualization method. The assessment of the students' cognitive style was made using the cognitive style inventory developed by Dr. Joseph E. Hill and his associates at Oakland Community College in Bloomfield Hills, Michigan. An audiovisual-tutorial instructional package in typewriting was selected as the individualized instructional method.

The subjects for the study were students in Introductory Typewriting I at Tompkins Cortland Community College in Dryden, New York. The cognitive style mapping inventory was administered to the student population and was then analyzed to produce an individual cognitive style map for each student. The degree of match between each student's individual cognitive style map and a theoretical map established for the AVT package by a panel of experts (outlining those elements required in each student's map if the student was to be successful in interaction with the package) was determined.

Students' success in interaction with various components of the course (typing theory, typing production, typing speed and accuracy, and final grade) was then analyzed based upon the degree of match between the student's map and the map of the package.

Twelve operational hypotheses were formulated to facilitate the answering of the questions posed in Chapter I.

The data collected were analyzed using the Kolmogorov-Smirnov two-sample statistical test of significance. Results of the tests are reported in Chapter IV and form the basis for the following conclusions, implications, and recommendations.

### Conclusions

The findings of the present study are as follows:

1. No significant difference was found among any of the three cognitive style match groups (high, medium, or low) in the scores of achievement in typewriting theory when measured in pairwise comparison.

2. No significant difference was found among any of the three cognitive style match groups (high, medium, or low) in the scores of achievement in typewriting production when measured in pairwise comparison.

3. No significant difference was found among any of the three cognitive style match groups (high, medium, or low) in the scores of achievement in speed and accuracy when measured in pairwise comparison.

4. No significant difference was found among any of the three cognitive style match groups (high, medium, or low) in the scores of achievement in the overall course grade when measured in pairwise comparison.

### Implications and Recommendations for Further Research

The present study did not find the relationship it hypothesized. On the basis of this study there appears to be no relationship between students' cognitive style and their degree of success with an audiovisual-tutorial instructional type-writing package. Further research may reveal that this relationship does exist.

Based upon the experiences and insights gained during the investigation certain implications for future investigations may be relevant to the field of cognitive style mapping and the educational sciences in general.

1. The present study should be replicated using a larger sample size. The increased sample size may permit a greater range of statistical alternatives to be considered with the possibility of greater discriminative precision.

2. The present study should be replicated incorporating careful measurement of the number of times students interact with the AVT package and the amount of interaction time. The implication here is that student-package interaction time may be a confounding variable in that given enough time in a competency-based curriculum mode all students could be able to reach minimum competency.

3. The present study should be replicated incorporating careful measurement of the student attitudes toward the mode

of instruction before and after the instruction takes place. The implication is that the student's attitude could have an over-riding effect on his/her degree of interaction (intensity) with the AVT package. The student's attitude may also be predicted by his/her level of cognitive style match with the AVT package.

4. The present study should be replicated with an alternative method for assessing the cognitive style of the sampled students. The Oakland Community College Cognitive Style Mapping Inventory used in this study assumes that students know their reactions under various hypothetical conditions which the student may or may not have been exposed to in real situations. Tests such as the one designed by Bass (1972) for diagnosing Q(CS) could be developed which may be more reliable in this study.

The instrument should also be designed to identify the four subsets of Qualitative Proprioceptive - Q(P) - which are: Qualitative Proprioceptive Kinematic - Q(PK), Qualitative Proprioceptive Temporal - Q(PT), Qualitative Proprioceptive Dextral - Q(PD), and Qualitative Proprioceptive Sinstral - Q(PS) (see p. 13 for explanation). The implication is that these programmatic effects may be important indicators of student performance in the speed/accuracy area of typewriting ability.

5. The present study should be replicated with a more discriminating "panel-of-expert" mapping procedure. When time permits the panel of experts should visit the AVT facility to involve themselves with the entire open-laboratory environment before designing the theoretical map for the AVT package.

The panel should also exercise extreme care when specifying elements in the map of the AVT package, including only those elements which are critical for the students' successful interaction with the package.

6. The present study should be replicated with, if possible, a more precise matching formula. The formula utilized in this study reduces the match score of a student if the element under investigation is a major orientation for the student but is only a minor orientation for the package. This indicates that the student's major, say in Qualitative Auditory, is a hindrance to that student in his/her interaction with the AVT package if all that is called for by the AVT map is a minor Qualitative Auditory.

In some situations a technique different than the one used in this study should be used for determining the cognitive style maps of an instructional package. In this study the panel of experts chose only those elements which were absolutely necessary in a student for that student to be successful in interaction with the package as the map for the

package. This indicates that the presence of other elements in the student's map has no bearing on success or failure of the student in interaction with the package. In some cases, however, the presence of an element in a student's map may prove to be a hindrance to that student's successful interaction with the package. It is in this situation where the different technique is called for. The package map should, in addition to those elements which are required of a student to be successful with the package, contain a recognition of those elements which if present in a student's map might hinder the student's success with the package.

Also, the replicator may be advised to investigate another mathematical calculation for the final determination of degree of match. The implication is that the importance (weighting) of each element in binomial combination in each set and the importance of the sets themselves should be examined and then the match calculations could be performed.

In addition, due to the large number of possible interactions of elements in the study, an alternative statistical method should be utilized that will allow the research to concentrate on only those elements critical to the prediction of success. One possibility may be a factor analysis of the cognitive style elements of the students in the study and then the utilization of the resulting factor scores as indicators of students' match with the AVT package.

7. This study should be replicated examining populations in other programs utilizing the audiovisual-tutorial approach to individualizing instruction. In this way more comprehensive conclusions can be drawn regarding the effectiveness of cognitive style mapping as a predictor of success with this form of instruction.

8. This study should be replicated using samples drawn in a more randomized format. Random selection of students in the sample (and random assignment to the instructional format, where possible) may negate the confounding variables such as IQ, GPA, cultural differences, family education, age, sex, etc., allowing the results to be further generalizable.

9. A study should be designed which attempts to determine if a student's cognitive style map may be used to indicate his/her degree of adaptability to modes of instruction with which he/she does not have a high degree of match. The study should also include analyses of other variables (IQ, GPA, cultural differences, family education, age, sex, etc.) which may be indicators of the adaptability referred to.

APPENDIX A

COGNITIVE STYLE MAPPING INVENTORY



Cognitive Style Map  
Survey

Corning Community College  
Corning, NY

Directions:

Answer each question with one  
of the following:

- A = Usually or Always
- B = Sometimes
- C = Seldom or Never

## TEST ONE

1. After I write a letter, I ask someone to read it aloud to me so that I know how it sounds.  
1F
2. When taking courses in mathematics, I find it easy to "talk in formulas" with my classmates and teacher.  
2D
3. I score high on achievement tests which depend upon reading comprehension.  
3D
4. When I am in a group of people trying to solve a written problem involving numbers, I am among the first to reach the correct solution.  
4D
5. My written explanations are more understandable than my spoken ones.  
3D
6. People say I speak more understandably than I write.  
1G
7. I prefer classes which rely heavily on textbooks for information.  
3C
8. I use a written budget to account for money for which I am responsible.  
4E
9. I prefer the traditional lecture type classes.  
1H
10. I can make more sense out of what a person means when he speaks to me rather than if he writes to me.  
1A
11. I prefer maps to verbal directions when I am going to a strange place.  
3E
12. I do better on a test if it is about information I have heard rather than read.  
1B
13. If I were buying a car, I would ask the salesman to write out or show me the printed engine specifications.  
4H
14. I understand the daily news better if I hear it on the radio rather than if I read it in the newspaper.  
1C
15. I discuss "sale" prices with others before I go shopping.  
2G
16. I can remember a telephone number once I have heard it.  
2F
17. I find it necessary to write down a telephone number as soon as I hear it in order to remember it.  
4F
18. I communicate with friends and colleagues by telephone rather than by writing messages to them.  
1D

## Test One (continued)

19. I prefer to read a newspaper myself rather than have someone read it aloud to me.  
3F
20. I prefer to follow verbal directions rather than written directions.  
1E
21. I prefer to read directions rather than have someone interpret them to me.  
3G
22. Verbal mathematics tests are easier for me than written mathematics tests.  
2C
23. When I go shopping, I read the price of each item and keep a running total in my head.  
4G
24. I quote statistical data to others in order to prove my point in an argument.  
2B
25. I find it comfortable to add spoken or dictated numbers mentally.  
2A
26. I understand more easily when I read information rather than when I hear it.  
3H
27. I achieve best on written mathematics tests.  
4B
28. After I dictate a letter, I read it to be certain it is correct.  
3A
29. It is easy for me to remember the numbers and formulas I have heard during a conversation.  
2E
30. I keep accurate written records in my check book.  
4C
31. If I were buying a car, I would discuss the engine specifications with the salesman or a friend.  
2H
32. I solve mathematical problems more rapidly if they are written.  
4A

## TEST TWO

1. I can identify music well enough to recognize a "tune" the next time I hear it.  
5D
2. I can tell "what's for dinner" by the smell when I enter the house.  
6A
3. When I tune a musical instrument, I use the piano or another source for the correct pitch.  
10F
4. My "suffering" in the dentist's chair is alleviated if he uses pleasant tasting materials in my mouth.  
7H
5. I can feel the difference between leather and metal.  
8A
6. A narrative is easier to understand in a movie than in a book.  
9E
7. I can tell if something is wrong with an engine by listening to it run.  
5A
8. Any unpleasant smell is more disturbing to me than to others.  
6G
9. When I drive a car, I look ahead and outside of the car rather than at the hood.  
10E
10. I can recognize who is on the phone just by listening to the voice for a few moments.  
5C
11. I prefer furniture that I enjoy running my hand over.  
8D
12. I prefer to read articles which are illustrated by pictures or drawings.  
9A
13. I enjoy trying new foods in order to find new tastes that I may like or wish to learn to like.  
7G
14. The tone or inflection of a speaker's voice gives additional meaning to his words.  
5B
15. I tune the radio by sounds not by the numbers on the dial.  
5H
16. I can write legibly as another dictates to me.  
10D
17. The "smell" is an important component of the pleasure connected with a new car.  
6F
18. In selecting a beverage, my choice is based on taste.  
7F
19. I can catch a ball that has been struck or thrown.  
10A
20. I return to a restaurant because of the taste of the food served there.  
7E
21. I can play ping pong well enough to enjoy it.  
10G

## Test Two (continued)

22. Random sounds interfere with my ability to concentrate on a conversation or on reading.  
5G
23. The taste of food is more important than its appearance.  
7C
24. I am certain that the customary smell of a store influences its sales volume.  
6E
25. I pick up and feel vegetables and fruits in the store before buying them.  
8E
26. When I tune a radio I use the numbers on the dial.  
9G
27. I can tell the difference between two closely pitched sounds.  
5F
28. Blindfolded, I can taste the difference between chocolate and coffee ice cream.  
7D
29. I decide that my hair needs washing by the way it feels when I touch it.  
8F
30. I have been told that I am a good dancer.  
10B
31. I enjoy looking at art work.  
9C
32. I am considered to be a "good" amateur athlete.  
10H
33. I prefer to write with a pen that "fits" my fingers.  
8H
34. I can distinguish fresh fruit from stale fruit by the smell.  
6B
35. I use my fingers to supplement my eyes to determine the quality of the finish on wood.  
8C
36. I am able to tell which instruments are playing at various times during a concert.  
5E
37. When cooking, I use various spices until the food tastes "right".  
7B
38. I choose clothes for the way they look on me.  
9B
39. I can distinguish between several varieties of flowers by smelling their blooms.  
6C
40. I can distinguish a nickel from a dime in my pocket with my fingers.  
8G
41. When there are gas fumes in the car or the house, I notice them sooner than others do.  
6H
42. I can tell if wine is sour by tasting it.  
7A
43. I understand a lecturer better if I can look at him as he talks.  
9D
44. The aromas in a room determine for me whether it is a pleasant or an unpleasant place.  
6D

## Test Two (continued)

45. I "think" in pictures and  
graphic models rather than  
in words and phrases.  
9F
46. I can button my coat in the  
dark.  
8B
47. When I type, I keep my eyes  
on the copy rather than on  
my fingers.  
10C
48. I feel better acquainted with  
someone if I see a picture of  
him/her rather than if I read  
about him/her.  
9H

## TEST THREE

1. I laugh with the person who laughs when he stubs his toe because I know it hurts yet he is too old to cry when he is clumsy.  
11H
2. Utility and efficiency are important but they should not be emphasized to the exclusion of beauty.  
12H
3. The quality of one's work does not deteriorate when the supervisor is away.  
13G
4. I am a good actor in plays.  
14B
5. I shrug my shoulders when saying "I don't know".  
15C
6. I try not to say things which hurt the feelings of others.  
11D
7. I enjoy the sight of people dancing.  
12A
8. I would stop for a "STOP" sign any time, even if there were no other person in sight.  
13H
9. When someone is frightened, I can be patient and calm rather than reply in anger.  
11F
10. I blush in situations where many others do not.  
15A
11. I can give the impression that I am happy and comfortable even though I am angry and uncomfortable.  
14C
12. I am able to offer criticism without offending others.  
11E
13. I can be patient with the inability to concentrate which characterizes those who are newly "in love".  
11G
14. The values of our society are good for everyone.  
13A
15. I require beauty in my surroundings outside as well as inside buildings.  
12B
16. I am able to "play a role" anywhere if I agree to.  
14D
17. I direct my life according to moral values.  
13B
18. I can act "learned" when the situation demands such formalized behavior.  
14E
19. I would give up monetary gain to avoid a compromise of principles.  
13C
20. My friends tell me that I am understanding.  
11A
21. I can act friendly and accepting in order to acquire favors.  
14F
22. I enjoy the author's writing style as much as the story he tells.
23. Eye movements are important supplements to my conversation.  
15H

## Test Three (continued)

- |   |  |
|---|--|
| <p>24. I "feel" the emotions of others as they do.<br/>11B</p> <p>25. I shout and act tough in order to frighten others when I am frightened myself.<br/>14G</p> <p>26. I use facial expressions to communicate emotions.<br/>15B</p> <p>27. I would give up monetary gain to avoid a compromise of principles.<br/>13D</p> <p>28. I do not permit personal affairs to interfere with completing an assignment.<br/>13E</p> <p>29. I "talk with my hands" more than others do.<br/>15D</p> <p>30. I enjoy listening to music when the quality of its sound is good.<br/>12D</p> <p>31. Walking with a spring in your step gives the impression that you are happy.<br/>15E</p> <p>32. I understand how a person feels when he is being punished.<br/>11C</p> <p>33. I can act attentive and interested even though bored when listening to a teacher or supervisor.<br/>14H</p> <p>34. I would go out of my way to see beautiful scenery.<br/>12E</p> | <p>35. When I shake hands with someone, the handshake tells me how sincere the person is.<br/>15F</p> <p>36. I enjoy the beauty of a well-designed structure.<br/>12F</p> <p>37. I can imitate someone else before a group well enough for recognition.<br/>14A</p> <p>38. Poetry is beautiful because of its concepts as well as its words and rhythm.<br/>12G</p> <p>39. I interpret a person's mood by the way they sit or stand.<br/>15G</p> <p>40. I believe that a promise should be kept.<br/>13F</p> |
|---|--|



## TEST FOUR

1. When I engage in sports, I practice or warm-up first.  
16F
2. If I attempted to kiss someone, I would not be slapped.  
17E
3. I can predict my responses in many situations.  
18A
4. I enjoy taking children to the zoo or library.  
19A
5. I know when I have reached my anxiety threshold.  
18H
6. To become a good typist, I would practice correct finger movements.  
16E
7. I can predict accurately how successful I will be in a new situation.  
18B
8. Sales people find the merchandise that I am asking for.  
19H
9. I have practiced handwriting skills so that I write legible now.  
16H
10. I am better coordinated than most people.  
16B
11. I predict accurately if I will be able to get my work done.  
18D
12. When learning a new dance, I am willing to practice the steps until I can do them perfectly.  
16D
13. In social situations I am able to verbally stop arguments involving others before they go too far.  
19G
14. When it is necessary, I can repair objects without watching my hands.  
16A
15. I know which strangers enjoy a pat on the back if I have an occasion to congratulate them.  
17H
16. I prefer to ask favors of close friends and associates rather than from work supervisors.  
17B
17. Peers involve me in resolving problems.  
19F
18. Learning to throw a ball the right way is important.  
16C
19. I set goals consistent with my needs and abilities.  
18C
20. I have enjoyed acquiring good motor skills so that I compete successfully in sports.  
16G
21. I can convince myself that boring tasks must be faced and completed.  
18G
22. I can recognize those who will welcome friendly overtures from me.  
17C
23. In group discussions, I assume the leadership to move the group to reach a decision.  
19B

## Test Four (continued)

24. I would wait to be introduced to a famous person rather than introduce myself.  
17A
25. First names are good if the other person prefers first names.  
17F
26. I know my strengths and weaknesses.  
18E
27. I am able to persuade people involved in disagreement to strive for agreement.  
19C
28. I know the physical energy that a particular task will require for me to complete it.  
18F
29. If I bump against another person in a store, I know whether to apologize profusely or with a single word.  
17G
30. I can convince others to willingly do the things that I would like them to do.  
19D
31. Unless spoken to first, I do not speak to a supervisor.  
17D
32. I am able to put people at ease in tense situations.  
19E

## TEST FIVE

1. I make it a point not to let my work interfere with family plans.  
21H
2. I enjoy activity more if my friends participate in it with me.  
20B
3. When given a job to do, I prefer to do it myself.  
22H
4. When shopping for clothes, I prefer having a friend along to help me make choices.  
20C
5. I make my own political choices.  
22A
6. I consult with my immediate family before making decisions.  
21G
7. After gathering data from many sources, I make decisions alone.  
22G
8. Family values should have lasting effects on each of us.  
21B
9. I like to share ideas with friends and associates.  
20D
10. I enjoy outdoor activities when I am with my family.  
21C
11. One's religion is a purely personal decision.  
22B
12. I make personal decisions after discussing them with my friends.  
20E
13. I talk with my family before doing anything that might affect them.  
21D
14. Before taking a new job, I would discuss it with my friends.  
20F
15. When given a problem to solve, I find the answer myself.  
22D
16. I consider my personal goals before the goals of others.  
22E
17. I find it important to consult my family in planning vacations.  
21E
18. I am influenced by my friends' political opinions.  
20G
19. I understand events better after discussing them with my family.  
21F
20. I do not need others to help me make decisions.  
22F
21. I would join a religious group if my friends belonged to it.  
20H
22. I learn a subject better when I can discuss it with my associate.  
20A
23. Before voting in an election I review the candidates with my family.  
21A
24. I would rather do things my way even if this does not conform to the expectations of my family or friends.  
22C

## TEST SIX

1. I can use jokes or humorous remarks to change the focus in many situations.  
23B
2. I find myself in the position of having to make a decision before I know enough about the situation.  
24A
3. I work best in an organized or structured situation.
4. I like to figure out the way the parts of a whole fit together.  
26B
5. I understand geometric theorems.  
27G
6. I understand a topic better if I analyze it to learn how it differs from other topics.  
23A
7. The more information you collect about a problem, the better your solution will be.  
24H
8. I have no sympathy for people who break the law.  
25B
9. Characteristics for successful people are not the same as those for unsuccessful people.  
23H
10. Knowledge flows logically from given premises.  
27F
11. I would find it interesting to discover how people behave by evaluating things which made people tick (e.g., physiological, sociological, and psychological).  
26A
12. I choose music that contrasts with my mood in order to control my feelings.  
23G
13. Holidays are different from other days of the year.  
23F
14. Life is simple if you go by the rules.  
25C
15. The more I know about a problem, the more I want to know about it.  
24G
16. I tend to think of all parts of the world as working together.  
26C
17. When shopping for clothes, I buy without further comparison if I find the article I had in mind.  
25F
18. Problem solving involves related variables.  
26H
19. In recreation as well as work and life in general, I find it essential to "play by the rules".  
25E
20. I "play the devil's advocate" with people to force them to look at another point of view.  
23E
21. I try to understand why people break rules.  
26F
22. A person can never know enough about the universe.  
24F

## Test Six (continued)

23. I find it easier to win an argument when I state a premise and give a conclusion that must be true. (This is a circle so the formula for the area is  $\pi r^2$ ).  
27E
24. In evaluating the performances of others, I find it helpful to determine how this performance differed from a previous performance.  
23D
25. There is always a reason for a person's behavior.  
26G
26. I find the type of reasoning demanded by the rules of mathematics suits my mode of thinking.  
27D
27. I prefer working in situations where standards and rules are stated explicitly.  
25D
28. In evaluating the performances of others, I find it important to determine the standards which were set for them.  
25H
29. I enjoy the reasoning patterns required in statistics.  
27C
30. I take longer than others in coming to a conclusion because I want to know more about an issue than most other people do.  
24E
31. I enjoy games or puzzles in which the solution is deduced from information contained in the rules.  
27A
32. In my choice of clothing, I wear contrasting colors.  
23C
33. When looking at something constructed by someone else (a painting, a building, furniture) I like to figure out why the person created it as he did.  
26D
34. Information should be analyzed in a number of ways before a conclusion is reached.  
24D
35. I avoid probability statements in solving problems.  
27H
36. One cannot appreciate a problem unless he knows as much about it as possible.  
24C
37. I have no difficulty in understanding how to put puzzles together.  
26E
38. When I attack a problem, I approach it from as many aspects as possible.  
24B
39. I find reasoning like this statement helps me to clarify my thoughts:  
"All men are mortal; Socrates is a man; therefore, Socrates is mortal."  
27B
40. I do not change my mind on a subject once I identify the rule which applies.  
25G

APPENDIX B

INSTRUMENTATION OF INVENTORY

OAKLAND COMMUNITY COLLEGE  
Bloomfield Hills, Michigan

Office of the President

March 12, 1975

I trust that in your conversations with Mr. Barney Herron, you understand that educational cognitive style is highly dependent upon what James Jenkins of the University of Minnesota, a theorist on the topic of memory, calls "contextualism." The basic notion underlying the use of a cognitive style test and inventory battery is to produce mathematical mappings which can be used by a trained mapper as aids to his empirical mappings of cognitive style elements. An analogy which might serve to clarify the issue would be that of how the medical doctor takes into account such mathematical mappings: body temperature, blood pressure, blood counts, counts of biochemical elements found in specimens of body fluids, and intensity counts associated with x-ray interpretations in the process of questioning the patient to gain "empirical data" to diagnose the condition of the patient. Essentially, the medical doctor holds his empirical mapping processes in a higher order of priority, or, if you will, "weight," than the mathematical mappings, in the process of diagnosing an individual's condition of health. Contextualism enters into the doctor's diagnosis in the form of a series of norms and situations with which the physician is trained to become familiar. For example, a physician may diagnose a 55-year-old man to be in "good health" in comparison with norms of 55-year-old persons in the context of pursuits usually included in the life space of a 55-year-old individual. If the person being examined were to indicate to the physician that he was planning to engage in physical activities (e.g., skiing, swimming) at a level of competition usually found associated with 19-22-year-old varsity performers, the medical doctor might well revise his diagnosis of "good health" in consideration of that context.

Regardless of the matters noted above, I can provide you with validity and reliability indices that have been found, not only in some of our work here at the College, but in those doctoral dissertations (of the 84 that have been completed in this area) dealing with community college samples. Under these circumstances, validity coefficients associated with the elements of T(VL), T(VQ), T(AL), and T(AQ) are as shown below:

T(VL)	Females = .80	T(AL)	Females = .75
	Males = .72		Males = .70
T(VQ)	Females = .72	T(AQ)	Females = .66
	Males = .73		Males = .61

Reliability coefficients are derived by means of the Kuder Richardson Formula, based upon the concept of domain sampling. The coefficients for T(VL), T(VQ), T(AL), and T(AQ) are as shown below:

T(VL)	Females = .93	T(AL)	Females = .89
	Males = .92		Males = .87
T(VQ)	Females = .92	T(AQ)	Females = .85
	Males = .93		Males = .82

The validity and reliability coefficients associated with these elements of cognitive style mapping have been derived from sub-tests of the Differential Aptitude Tests (4th Ed. - Forms L and M - The Psychological Corp. - 1966), the Nelson-Denny Reading Test, the Carlson-Brown Listening Test, and the quantitative section of the "Wechsler." Point by serial correlation coefficients for the qualitative symbolic elements, the cultural determinant elements of individuality, associates, and family; the modalities of inference elements of magnitude, difference, relationship, and appraisal show the range of values in biserial correlation coefficients indicated below:

$$\text{low } r_{\text{bis}} = .54, \text{ to } r_{\text{bis}} = .93$$

The average biserial coefficient value for all these elements is:

$$r_{\text{bis}} = .783$$

The reliability for the inventories that provide results for the mapping of these elements of styles is a Kuder Richardson:  $r = .81$ . In regard to the topic of predictability, this matter depends greatly upon the ability of the diagnostician to empirically map the style of the individual under consideration in the context, or intended context, of the instructional setting.

I have asked my secretary to include a somewhat antiquated list of doctoral dissertations that have been completed in the Educational Sciences. Although I have copies of all the dissertations that have been completed in the Educational Sciences, many of them are on



loan to persons currently engaged in doctoral dissertation work. Under these circumstances, I would be hard-pressed to make these materials available to you. If I can resolve any of your difficulties by telephone, I would be most happy to oblige.

Thank you for your interest in these matters, and also for your understanding of the inordinate delay in my response to your letter.

Sincerely,

Joseph E. Hill  
President

JEH/sp

APPENDIX C

TYPEWRITING EXPERIENCE QUESTIONNAIRE

COGNITIVE MAPPING/TYPING QUESTIONNAIRE

Name \_\_\_\_\_ Program \_\_\_\_\_

Address \_\_\_\_\_ Semester in College \_\_\_\_\_

Place of Birth \_\_\_\_\_ Date of Birth \_\_\_\_\_

Parents' Occupation:

Mother \_\_\_\_\_ Where Employed \_\_\_\_\_

Father \_\_\_\_\_ Where Employed \_\_\_\_\_

Previous Experience: ☐ No Experience

☐ Personal Typing - high school

☐ Typing I - high school

☐ Typing II - high school

☐ Self-instruction

☐ "Hunt and Peck"

☐ Other \_\_\_\_\_

Why are you enrolled in typing? ☐ Course Requirement

☐ Own Benefit

Previous Education: ☐ High School Diploma

☐ Two-year college degree

☐ Four-year college degree

☐ Greater than four-year degree

APPENDIX D

STUDENTS' MAPS

---

Student #1

T' (AQ)  
T' (VL)  
T' (VQ)  
  
Q (CS)  
Q (CKH)  
Q (T)  
Q (P)  
Q (A)  
Q' (CET)  
Q' (V)

I  
F'

M'

---

Student #2

T' (AL)  
T' (AQ)  
T' (VL)  
  
Q (CS)  
Q (CET)  
A (CKH)  
Q (V)  
Q (T)  
Q (P)  
Q (A)

I  
F

M

---

Student #3

T' (AL)  
T' (AQ)  
T' (VAL)  
T (VQ)  
  
Q (CS)  
Q (CET)  
Q' (CKH)  
Q (V)  
Q (P)  
Q (A)  
Q' (T)

I  
F'

M'

Student #4

$$\begin{bmatrix} T'(AL) \\ T'(AQ) \\ T'(VL) \\ T'(VQ) \\ \\ Q'(CKH) \\ Q(T) \\ Q'(CS) \\ Q'(V) \\ Q'(P) \\ Q'(A) \end{bmatrix}$$

$$\begin{bmatrix} I \\ F \end{bmatrix}$$

$$\begin{bmatrix} M' \end{bmatrix}$$

Student #5

$$\begin{bmatrix} T'(AL) \\ T'(AQ) \\ T'(VL) \\ T'(VQ) \\ \\ Q(CS) \\ Q(V) \\ Q(T) \\ Q(A) \\ Q'(CET) \\ Q'(CKH) \\ Q'(P) \end{bmatrix}$$

$$\begin{bmatrix} I' \\ F \end{bmatrix}$$

$$\begin{bmatrix} M \end{bmatrix}$$

Student #6

$$\begin{bmatrix} T(AL) \\ T'(AQ) \\ T'(VL) \\ T(VQ) \\ \\ Q(CKH) \\ Q(V) \\ Q(T) \\ Q(P) \\ Q'(CET) \\ Q'(CS) \\ Q'(A) \end{bmatrix}$$

$$\begin{bmatrix} I' \\ F \end{bmatrix}$$

$$\begin{bmatrix} M' \end{bmatrix}$$

Student #7

$$\begin{bmatrix} T' (AL) \\ T' (AQ) \\ T' (VL) \\ T' (VQ) \\ \\ Q (CET) \\ Q (T) \\ Q (P) \\ Q (A) \\ Q' (CS) \\ Q' (CKH) \\ Q' (V) \end{bmatrix}$$

$$\begin{bmatrix} I' \\ F' \end{bmatrix}$$

$$\begin{bmatrix} M \end{bmatrix}$$

Student #8

$$\begin{bmatrix} T' (AL) \\ T' (AQ) \\ T' (VQ) \\ \\ Q (CET) \\ Q (CS) \\ Q (CKH) \\ Q' (V) \\ Q' (T) \\ Q' (P) \\ Q' (A) \end{bmatrix}$$

$$\begin{bmatrix} I \end{bmatrix}$$

$$\begin{bmatrix} M \end{bmatrix}$$

Student #9

$$\begin{bmatrix} T' (AL) \\ T' (AQ) \\ T (VL) \\ T (VQ) \\ \\ Q (V) \\ Q (T) \\ Q (P) \\ Q (A) \\ Q' (CKH) \\ Q' (CET) \\ Q' (CS) \end{bmatrix}$$

$$\begin{bmatrix} I' \\ F \end{bmatrix}$$

$$\begin{bmatrix} M' \end{bmatrix}$$

Student #10

$$\begin{bmatrix} T'(AL) \\ T'(AQ) \\ T(VL) \\ \\ Q'(CKH) \\ Q(CS) \\ Q(CET) \\ Q'(V) \\ Q'(T) \\ Q'(P) \\ Q'(A) \end{bmatrix}$$

$$\begin{bmatrix} I' \end{bmatrix}$$

$$\begin{bmatrix} M' \end{bmatrix}$$

Student #11

$$\begin{bmatrix} T'(AL) \\ T'(VL) \\ T'(VQ) \\ \\ Q(V) \\ Q(T) \\ Q(P) \\ Q(A) \\ Q'(CET) \\ Q'(CS) \\ Q'(CKH) \end{bmatrix}$$

$$\begin{bmatrix} I' \\ F \end{bmatrix}$$

$$\begin{bmatrix} M' \end{bmatrix}$$

Student #12

$$\begin{bmatrix} T'(AL) \\ T'(AQ) \\ T(VL) \\ T(VQ) \\ \\ Q(CS) \\ Q'(CKH) \\ Q(T) \\ Q(P) \\ Q(A) \\ Q'(CET) \\ Q'(V) \end{bmatrix}$$

$$\begin{bmatrix} I' \\ F' \end{bmatrix}$$

$$\begin{bmatrix} M' \end{bmatrix}$$



Student #13

$$\begin{bmatrix} T'(AL) \\ T'(AQ) \\ T'(VL) \\ T'(VQ) \\ \\ Q(CS) \\ Q(CET) \\ Q(CKH) \\ Q(T) \\ Q(P) \\ Q(A) \\ Q'(V) \end{bmatrix}$$

$$\begin{bmatrix} I \\ F \end{bmatrix}$$

$$\begin{bmatrix} M' \end{bmatrix}$$

Student #14

$$\begin{bmatrix} T(VL) \\ T'(VQ) \\ \\ Q(T) \\ Q(A) \\ Q'(CS) \\ Q'(CET) \\ Q'(CKH) \\ Q'(V) \\ Q'(P) \end{bmatrix}$$

$$\begin{bmatrix} I \\ F' \end{bmatrix}$$

$$\begin{bmatrix} M \end{bmatrix}$$

Student #15

$$\begin{bmatrix} T(AL) \\ T(AQ) \\ T'(VL) \\ T(VQ) \\ \\ Q(CS) \\ Q(CKH) \\ Q(V) \\ Q(T) \\ Q(P) \\ Q(A) \end{bmatrix}$$

$$\begin{bmatrix} I \\ F' \end{bmatrix}$$

$$\begin{bmatrix} M' \end{bmatrix}$$

Student #16

$$\begin{bmatrix} T' (VL) \\ T' (AL) \\ T' (VQ) \\ T' (AQ) \\ \\ Q (CS) \\ Q (CET) \\ Q' (CKH) \\ Q (V) \\ Q (T) \\ Q (P) \\ Q (A) \end{bmatrix}$$

$$\begin{bmatrix} I \\ F \end{bmatrix}$$

$$\begin{bmatrix} M' \end{bmatrix}$$

Student #17

$$\begin{bmatrix} T' (AL) \\ T' (AQ) \\ T' (VL) \\ T' (VQ) \\ \\ Q (CS) \\ Q (CET) \\ Q (T) \\ Q (A) \\ Q' (CKH) \\ Q' (V) \\ Q' (P) \end{bmatrix}$$

$$\begin{bmatrix} I \\ F \end{bmatrix}$$

$$\begin{bmatrix} M' \end{bmatrix}$$

APPENDIX E

COURSE OUTLINE

## TYPING 101 STUDENT INFORMATION SHEET

INSTRUCTOR: Steve Landau

CLASS HOURS: Section 1: M, T, Th, F 8:00 a.m.  
Section 2: M, T, Th, F 11:00 a.m.

ROOM: 505

1. Typing 101 - A two-credit course aimed at preparing the student to progress to the more advanced courses in the Secretarial Science curriculum. This course demands the following of the student:
  - a. Do all lessons in sequence
  - b. Take Production Tests as they occur
  - c. Do all Theory Tests and Final Exam
  - d. The final grade is based on: Theory tests, 30%; Production Tests, 30%; Typing Speed, 20%; and Final Exam, 20%.
  - e. Straight copy speed ranges: 45+ = A; 40-44 = B; 34-39 = C; 30-33 = D.
2. Supplies for the course: In Typing 101, the student should purchase the following: Typing 1 Book by Media Systems, typing paper (non-erasable), typing eraser, and carbon paper.
3. Erasing: Once you are shown how to erase, all typing errors in your daily work are to be erased. You are to use a typing eraser only. NEVER use the liquid white-out. It is not an acceptable method of correcting errors on letters to be mailed, and it also damages the typewriter.
4. Production Tests: The primary purpose of these tests are to see if you can remember how to set up typing problems without a book to follow. The objectives of these tests are as follows:
  - a. To demonstrate a knowledge of the form and/or procedures of a particular unit.
  - b. To work as efficiently as possible to complete an assignment with primary emphasis on the quality versus the quantity of work in the amount of time given to do the work.
5. Advice on preparing for Production Tests: When you are taking a Production Test, take the time to see if the following are done:
  - a. If there is a theory test before or with the Production

Test, take the Theory Test first as a check of your knowledge of form, etc.

- b. Be sure that you have all supplies you will need for the test. This means to check your book which lists all the basic supplies that you will need and be sure you have an eraser, carbon paper, and file card for erasing.
- c. Check out your typewriter to make sure all parts are working before taking the test.

## TOMPKINS CORTLAND COMMUNITY COLLEGE

## Audio Visual Tutorial Typing

## Class Outline

General Information

The A.V.T. (Audio-Visual-Tutorial) method of teaching means that the major portions of various units of instruction are presented on short, carefully prepared slides and tapes. By having this instruction on slides and tapes, the instructor is free to move about the classroom and give individual help to any student who may be experiencing difficulty.

You will take your lesson package from a shelf in the typing classroom and view the slides in a carrel located just outside the classroom in areas 524. The slides can be viewed as many times as necessary for you to grasp the information presented in the lesson. This method of instruction is designed to meet the needs of the majority of students entering college typing classes, regardless of typing backgrounds. It allows each student to move through the course at his/her own individual speed. A student doesn't have to worry about what lesson the rest of the class is on; he/she will be concerned only with his/her own program and progress in that program.

Pretesting

If you have never taken a typing course before, you will not be pretested. You should be enrolled in SECS 101 (or 100) -- Elementary Typewriting. If you have had previous typing experience, you have three options: (1) You can take the proficiency test covering the elementary typing course or the test covering the intermediate typing course; (2) You can take a pretest designed to place you in advance standing in the course; (3) You may begin at the beginning of the course and do all lessons, forgetting about pretesting.

If you take the proficiency test (option #1) and pass it, you receive credit for the course which the test covered. You then enroll in the next typing course. If you choose option #2, the pretesting for advance placement, you will be able to skip all lessons in which you demonstrate an acceptable level of knowledge. This allows you to move through the course at a much faster rate of speed or to spend more time on each individual lesson, since you don't have as many lessons to cover.

If you have had previous typing but feel it was much too long ago for you to remember very much, you may choose to begin with the first lesson in the course (option #3). Each individual will set up his/her own personal program with the instructor.

Proficiency tests will be given three times a year: September, January, and June. Pretests will be given on the first day you enter the typing classes after enrolling at TC3.

### Attendance

The section of typing for which you have registered is scheduled to meet at a definite period of the day. You are required to attend that class. Daily attendance will be taken. That is the only time you will have availability to your instructor for help with your lessons. Other instructors in the program will not check off lessons, etc. For those who need extra drill, we will be running an open lab from 2-5 p.m. in Room 505 each day. A technical assistant will be available to help you with typewriter problems, problems in the carrel lab, etc., but she will not check lessons for you. All lessons must be given to your instructor. You will be allowed to complete up to two lessons before having to check with your instructor. If at all possible, you should check with your instructor after each lesson is completed. If you complete your lesson during the open lab hours, you may place the lesson in the proper basket for your class, and the instructor for your section will pick it up for checking. It will be returned to you at your next class period.

### Testing Within the Course

All three typing courses have theory tests which must be taken at specific intervals throughout the course. These tests will be taken on an individual basis. Whenever you are ready to take the test, ask your instructor for the test and then move away from your typewriter to a testing table to complete the test. Give it to your instructor or her aide when complete. Do not put it in a basket.

Production tests are required in Typing 101 and 102. These tests are timed and will be taken as a class group on definite days determined by your instructor.

Timed writings will be taken throughout all three courses by the use of pre-recorded tapes. These writings have to be submitted with each lesson and recorded on your daily card. You will also be given timed writings as a class group, being timed by your instructor using a time clock. These timings will be given at the beginning of the period on days designated by your instructor.

If you complete the typing course exceptionally early, you may take your final exam upon completion of your course. Otherwise, you will take the exam as a class group on a day determined by your instructor or by the registrar.

### Incompletes

With good working habits and daily attendance, there should be no reason for having to receive an incomplete for the course. If through some unforeseen interruption you should not be able to complete all lessons by the end of the semester, you must meet privately with your instructor and discuss the situation. The instructor will then determine what can be done about your grade for the course. If you do not seek out your instructor and discuss the situation, you will automatically receive an N/C for the course. In order to receive credit for the course, you will then have to reregister for the same course the following semester. It is very important that you heed this WARNING. Incompletes are not automatic.

### Grading

The final grade for each of the three typing courses will be based on grades obtained on theory tests, the five-minute speed tests, the production tests (101 and 102), daily lessons, and the final exam score. The weights given each of these areas in obtaining the final grade are given on the back of your lab sheet for your particular course.



## APPENDIX F

THEORY TESTS, FINAL EXAMINATION, PRODUCTION TESTS

## Theory Test 1

### INSTRUCTIONS

---

Select the alternative (a, b, or c) that best completes each statement. Record your choice on the answer sheet by blackening the space under the letter that indicates your choice. Do not mark the test itself.

1. When inserting paper into the machine, place the paper:
  - a. between the paper table and the cylinder.
  - b. between the cardholder and the carrier.
  - c. between the paper table and the copy guide scale.
2. To set the typewriter for single or double spacing, use:
  - a. the space bar.
  - b. the line space selector.
  - c. the variable line spacer.
3. The carrier moves the \_\_\_\_\_ along the width of the cylinder.
  - a. typing position indicator
  - b. element
  - c. paper
4. When inserting paper into the machine, the first step is:
  - a. to pull the paper release lever forward.
  - b. to turn the machine off.
  - c. to pull the paper lock forward.
5. After a semicolon:
  - a. do not space.
  - b. space once.
  - c. space twice.

**GO ON TO THE NEXT PAGE.**

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6. When the paper is in the typewriter, it rests:
  - a. against the paper lock.
  - b. against the paper table.
  - c. against the margin scale.
7. To move the carrier back to the left margin and down to the next typing line, use:
  - a. the carrier return key.
  - b. the line space selector.
  - c. the space bar.
8. When typing, sit back in your chair with your body erect and:
  - a. your feet crossed at the ankles.
  - b. your feet side by side.
  - c. one foot slightly in front of the other.
9. The backspace key is controlled by the \_\_\_\_\_ finger.
  - a. a
  - b. semicolon
  - c. right index
10. After a period within an abbreviation:
  - a. do not space.
  - b. space once.
  - c. space twice.
11. The paper is held firmly against the cylinder:
  - a. by the paper lock and rollers.
  - b. by the paper guide.
  - c. by the typing position indicator.
12. If you hold the carrier return key down:
  - a. the paper will automatically move up 2 lines.
  - b. the paper will move up only 1 line.
  - c. the paper will continue spacing upward.
13. In a horizontal inch, there are \_\_\_\_\_ elite spaces.
  - a. 10
  - b. 11
  - c. 12
14. The front of the frame of the typewriter should be positioned:
  - a. back slightly from the edge of the desk.
  - b. out over the edge of the desk slightly.
  - c. even with the edge of the desk.
15. Typewriter keys should be:
  - a. pushed down slowly and deliberately.
  - b. held down until the letter appears on the paper.
  - c. struck and released quickly.

16. After a question mark at the end of a sentence:
  - a. do not space.
  - b. space once.
  - c. space twice.
17. On standard-size typing paper, the maximum line length for an elite typewriter is \_\_\_\_\_ characters and spaces.
  - a. 66
  - b. 102
  - c. 85
18. If you want to leave a blank space between two words, the space bar should be:
  - a. struck with a quick down-and-in motion.
  - b. depressed slowly and deliberately.
  - c. held down longer than the letter keys.
19. An elite typewriter is also called a \_\_\_\_\_ machine.
  - a. 9-pitch
  - b. 10-pitch
  - c. 12-pitch
20. To release the paper from the machine quickly and easily, use:
  - a. the paper guide.
  - b. the paper release lever.
  - c. the power switch.
21. To set the width of the typing line, adjust:
  - a. the typing position indicator.
  - b. the margin set controls.
  - c. the paper guide.
22. In a horizontal inch, there are \_\_\_\_\_ pica spaces.
  - a. 10
  - b. 11
  - c. 12
23. When typing a single capital letter controlled by the left hand, use:
  - a. the left shift key.
  - b. the right shift key.
  - c. the shift lock.
24. When you type, place your copy:
  - a. on the left of the typewriter.
  - b. next to the typing paper.
  - c. on the right of the typewriter.
25. Place the left edge of the paper against:
  - a. the copy guide.
  - b. the paper guide.
  - c. the paper lock.

26. When typing a single capital letter controlled by the right hand, use:
- the right shift key.
  - the shift lock.
  - the left shift key.
27. A full sheet of standard-size typing paper measures:
- 8 inches wide  $\times$  11½ inches long (20.3 cm wide  $\times$  29.2 cm long).
  - 8½ inches wide  $\times$  11 inches long (21.6 cm wide  $\times$  27.9 cm long).
  - 8½ inches wide  $\times$  11½ inches long (21.6 cm wide  $\times$  29.2 cm long).
28. To align paper properly in the typewriter you can use:
- the index key.
  - the paper lock rollers.
  - the variable line spacer.
29. "Type pitch" is the term used for the number of spaces and characters that can be typed:
- per inch.
  - per line.
  - per page.
30. When you type, place the typing paper on the \_\_\_\_\_ side of the typewriter.
- the left
  - the right
  - the left or the right
31. To change the pitch from pica to elite on a Selectric II machine, use:
- the line space selector.
  - the typing position indicator.
  - the dual-pitch lever.
32. One correct way to turn the cylinder when inserting paper is to use:
- the right cylinder knob.
  - the left cylinder knob.
  - the paper lock rollers.
33. To see where the next character will be typed, in relation to the margin scale, check:
- the typing position indicator.
  - the margin set controls.
  - the line space selector.
34. Before sliding it to the desired left margin setting, the left margin set control must be:
- pulled out.
  - pushed in.
  - pushed down.

35. The long black roller behind which the paper is inserted is:
- the paper guide.
  - the cylinder.
  - the paper lock.
36. To turn the cylinder, use:
- the cylinder knobs.
  - the paper lock rollers.
  - the typing position indicator.
37. In a vertical inch (2.5 cm), there are \_\_\_\_\_ typing lines.
- 5
  - 6
  - 7
38. To move the carrier to the left one space at a time, use:
- the space bar.
  - the carrier return key.
  - the backspace key.
39. Return your fingers to the home-row keys each time you complete:
- a stroke.
  - a word.
  - a line.
40. To move the paper up to the next typing line without returning the carrier to the left margin setting, use:
- the index key.
  - the carrier return key.
  - the variable line spacer.
41. On standard-size typing paper, the maximum line length for a pica typewriter is \_\_\_\_\_ characters and spaces.
- 66
  - 85
  - 102
42. On a Selectric II machine, to move the carrier to the left quickly, use:
- the space bar.
  - the express backspace key.
  - the index key.
43. After a comma used in a sentence:
- do not space.
  - space twice.
  - space once.
44. A pica typewriter is also called a \_\_\_\_\_ machine.
- 9-pitch
  - 10-pitch
  - 12-pitch

45. To turn the typewriter on and off, use:
- the cylinder knob.
  - the carrier return key.
  - the power switch.
46. After a period at the end of a sentence:
- do not space.
  - space once.
  - space twice.
47. You will type most efficiently if you:
- move your hands and arms forward and backward freely.
  - rest your wrists on the frame of the typewriter.
  - keep your fingers on or near the home-row keys and your forearms parallel with the typewriter.
48. To leave a blank space between two words, use:
- the backspace key.
  - the line space selector.
  - the space bar.
49. The carrier return key is controlled by the \_\_\_\_\_ finger.
- a
  - semicolon
  - right index
50. To remove paper from the typewriter:
- pull the paper release lever forward with your right hand and remove the paper with your left hand.
  - pull the paper release lever forward with your left hand and remove the paper with your right hand.
  - pull the paper release lever forward and depress the index key.

**THIS IS THE END OF THEORY TEST 1**

## Theory Test 2

### INSTRUCTIONS

---

Select the alternative (a, b, or c) that best completes each statement. Record your choice on the answer sheet by blackening the space under the letter that indicates your choice. Do not mark the test itself.

1. To type an exclamation point on a machine that does not have a special exclamation point key, type a period with \_\_\_\_\_ above it.
  - a. a diagonal
  - b. a lowercase *L*
  - c. an apostrophe
2. Before and after a hyphen within a word:
  - a. do not space.
  - b. space once.
  - c. space twice.
3. The ampersand (&) means:
  - a. "at."
  - b. "also."
  - c. "and."
4. To type on the red portion of a combination red/black fabric ribbon, adjust:
  - a. the impression control.
  - b. the ribbon control mechanism.
  - c. the typing position indicator.

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5. For a 60-space typing line with the paper centered and the centering point at 66, set the left margin on \_\_\_\_\_.
- 31
  - 36
  - 41
6. Type a street name that is a number above ten:
- in figures.
  - spelled out.
  - to match the format of the house number.
7. The ) is called:
- a left parenthesis.
  - a right parenthesis.
  - a left bracket.
8. If your 1-minute base rate is 20, your ¼-minute accuracy goal is \_\_\_\_\_.
- 4
  - 5
  - 6
9. The @ is the symbol that means:
- "number."
  - "and."
  - "at."
10. Type a series of two or more mixed numbers in copy as  
\_\_\_\_\_.
- $25\frac{1}{4}$  and  $3\frac{5}{8}$
  - $25\frac{1}{4}$  and  $3\frac{5}{8}$
  - $25\frac{1}{4}$  and  $3\frac{5}{8}$
11. Between a dollar sign and the following figure:
- do not space.
  - space once.
  - space twice.
12. The \$ is called:
- a cent sign.
  - a percent sign.
  - a dollar sign.
13. Between a percent sign and a number:
- do not space.
  - space once.
  - space twice.
14. A number symbol in front of a figure indicates:
- pounds.
  - length.
  - number.

15. For a 50-space typing line with the paper centered and the centering point at 43, set the left margin on \_\_\_\_\_.
- 13
  - 18
  - 23
16. To set a tab stop for a 5-space paragraph indentation, space in 5 times from the left margin and depress:
- the "set" end of the tabulator control key.
  - the "clear" end of the tabulator control key.
  - the tabulator key.
17. In a business letter or other text material, type an amount of money under \$1:
- in figures, with a decimal point and a dollar sign.
  - in figures, with the word *cents* spelled out.
  - in figures, with ¢.
18. The ' is called:
- a quotation mark.
  - an exclamation point.
  - an apostrophe.
19. Between quotation marks and the word or words they enclose:
- do not space.
  - space once.
  - space twice.
20. After a colon used to separate hours and minutes in an expression of time:
- do not space.
  - space once.
  - space twice.
21. The \* is called:
- an "at" sign.
  - an ampersand.
  - an asterisk.
22. A number symbol after a figure indicates:
- pounds.
  - length.
  - number.
23. To release the shift lock, strike the \_\_\_\_\_ key.
- tabulator control
  - margin release
  - left or right shift
24. On the IBM Selectric, a small dot on the margin scale indicates:
- the left margin setting.
  - the horizontal centering point.
  - the vertical centering point.

25. For a 60-space typing line with the paper centered, the centering point at 66, and a bell allowance of 12, set the right margin on \_\_\_\_\_.  
a. 93  
b. 96  
c. 105
26. To determine your GWAM on a 3-minute timed writing, divide the total number of words typed by \_\_\_\_\_.  
a. 5  
b. 10  
c. 3
27. Between a number symbol and the figure with which it is typed:  
a. do not space.  
b. space once.  
c. space twice.
28. Before and after an ampersand in a company name:  
a. do not space.  
b. space once.  
c. space twice.
29. The % means:  
a. "and."  
b. "percent."  
c. "cents."
30. In figuring GWAM, 1 word is equal to \_\_\_\_\_ strokes.  
a. 5  
b. 8  
c. 10
31. The vertical line at the top of the plastic cardholder is always in vertical alignment:  
a. with the typing position indicator.  
b. with the horizontal centering point.  
c. with the left margin setting.
32. Between parentheses and the word or words they enclose:  
a. space once.  
b. space twice.  
c. do not space.
33. The ( is called:  
a. a left parenthesis.  
b. a right parenthesis.  
c. a right bracket.
34. Before and after a dash:  
a. do not space.  
b. space once.  
c. space twice.

35. Before or after a comma within a figure:
- do not space.
  - space once.
  - space twice.
36. Before and after an apostrophe used within a word:
- do not space.
  - space once.
  - space twice.
37. For a 50-space typing line with the paper centered and the centering point at 43, set the bell to ring on \_\_\_\_\_.
- 62
  - 65
  - 68
38. To type a minus sign, use:
- the underscore.
  - the dash.
  - the hyphen.
39. The # is called:
- an ampersand.
  - a number symbol.
  - an "at" sign.
40. After a colon used within a sentence:
- do not space.
  - space once.
  - space twice.
41. A comma that follows underlined copy is \_\_\_\_\_ underlined.
- always
  - never
  - sometimes
42. Between a decimal point and the figure that follows it:
- do not space.
  - space once.
  - space twice.
43. Between a number and a cent sign:
- do not space.
  - space once.
  - space twice.
44. To type a dash, use:
- one hyphen.
  - two hyphens.
  - two underlines.



45. The " is called:
- an apostrophe.
  - a parenthesis.
  - a quotation mark.
46. Before and after an "at" sign:
- do not space.
  - space once.
  - space twice.
47. To clear previously set tab stops, before depressing the carrier return key, depress and hold down:
- the margin release key.
  - the "set" end of the tabulator control key.
  - the "clear" end of the tabulator control key.
48. To regulate the amount of pressure with which the typing element strikes the paper, adjust:
- the ribbon control mechanism.
  - the impression control.
  - the paper release lever.
49. The ¢ is called:
- a dollar sign.
  - a cent sign.
  - a percent sign.
50. If your typewriter does not have a special key for the numeral 1, use:
- the capital L.
  - the diagonal.
  - the lowercase L.

**THIS IS THE END OF THEORY TEST 2**

# Theory Test 3

## INSTRUCTIONS \_\_\_\_\_

Select the alternative (a, b, or c) that best completes each statement. Record your choice on the answer sheet by blackening the space under the letter that indicates your choice. Do not mark the test itself.

1.  means:
  - a. "raise."
  - b. "lower."
  - c. "center."
2. On a postal card, begin typing the recipient's address on line \_\_\_\_\_.
  - a. 9
  - b. 10
  - c. 11
3.  means:
  - a. "reposition."
  - b. "close up (no space)."
  - c. "add space."
4. Use an erasing shield:
  - a. to prevent eraser particles from getting into the typewriter.
  - b. to avoid making a hole in the paper.
  - c. to prevent accidental erasing of surrounding letters.
5. To type a spread title, leave:
  - a. 1 space between letters and 3 spaces between words.
  - b. 2 spaces between letters and 3 spaces between words.
  - c. 1 space between letters and 2 spaces between words.

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6. Always type the recipient's address on an envelope or a postal card using:
  - a. single spacing.
  - b. double spacing.
  - c. triple spacing.
7. Between the body of a letter and the complimentary close, you should:
  - a. single-space.
  - b. double-space.
  - c. triple-space.
8. To center a line horizontally, backspace from the center:
  - a. once for every letter and space in the line.
  - b. twice for every letter and space in the line.
  - c. once for every 2 letters and spaces in the line.
9. In the reference initials on a business letter, use lowercase letters to indicate:
  - a. the sender.
  - b. the recipient.
  - c. the typist.
10. When you are addressing a letter to a company or an organization as a whole, an appropriate salutation would be \_\_\_\_\_.
  - a. Ladies and Gentlemen
  - b. Dear Madam or Sir
  - c. Madam or Sir
11.  means:
  - a. "add space."
  - b. "insert."
  - c. "raise."
12. After the title of a theme, you should:
  - a. double-space.
  - b. leave 3 blank lines.
  - c. triple-space.
13. The dateline and the inside address on a short letter are separated by \_\_\_\_\_ blank lines.
  - a. 5 to 7
  - b. 10 to 12
  - c. 8 to 10
14.  means:
  - a. "transpose."
  - b. "delete."
  - c. "double-space."
15. The correct format for a dateline in a letter or memorandum is:
  - a. 12/12/78.
  - b. December 12, 1978.
  - c. Dec. 12, 1978.

16. When you use the backspace method of horizontal centering, an odd or leftover letter is:
- disregarded.
  - doubled.
  - counted.
17. The dateline and the inside address on a long letter are separated by \_\_\_\_\_ blank lines.
- 10 to 12
  - 5 to 7
  - 8 to 10
18. After each paragraph in a letter, you should:
- single-space.
  - triple-space.
  - double-space.
19. In a personal letter, the complimentary close and the typewritten name of the sender are separated by \_\_\_\_\_ blank lines.
- 3
  - 4
  - 5
20. Before erasing an error at the center of the paper:
- roll the paper down and pull it forward, using the front of the typewriter cover as a firm surface.
  - roll the paper up and use the cylinder as a firm surface.
  - roll the paper up and use the paper table as a firm surface.
21. Type the message side of a postal card with a \_\_\_\_\_ typing line.
- 4-inch
  - 4½-inch
  - 5-inch
22. The correct mailing address abbreviation for the state of Nevada is \_\_\_\_\_.
- NV
  - Nev.
  - NV.
23. When you type a short letter, use a \_\_\_\_\_-space line.
- 50
  - 60
  - 70
24. To leave a top margin of 1½ inches (about 4 cm), begin typing on line \_\_\_\_\_.
- 8
  - 9
  - 10



25. You may make corrections when typing names, dates, and amounts:
- in a legal document.
  - on a check.
  - in a business letter.
26. When typing a personal letter, begin the return address on line \_\_\_\_\_.
- 10
  - 11
  - 12
27. # means:
- "single-space."
  - "add space."
  - "close up (no space)."
28. ¶ means:
- "paragraph."
  - "no paragraph."
  - "reposition."
29. When typing a personal letter in modified block style, make sure the return address and dateline:
- end at the right margin.
  - begin at the center or 5 spaces to the right of center.
  - begin at the left margin.
30. When you use open punctuation in a letter, type \_\_\_\_\_ after the salutation.
- a comma
  - a colon
  - no punctuation
31. To leave 4 blank lines between the date and the subject line of a memorandum, strike the carrier return key \_\_\_\_\_ times.
- 4
  - 5
  - 6
32. The dateline and the inside address on a medium letter are separated by \_\_\_\_\_ blank lines.
- 5 to 7
  - 8 to 10
  - 10 to 12
33. When the sender's name and title are typed on separate lines below the complimentary close, separate them by \_\_\_\_\_ blank line(s).
- 0
  - 1
  - 2

34. On a postal card, begin typing the recipient's address \_\_\_\_\_ in from the left edge.
- 1 inch
  - 1½ inches
  - 2 inches
35. Begin typing the return address on a small envelope:
- on the second line from the top and 3 spaces in from the left edge.
  - on the third line from the top and 2 spaces in from the left edge.
  - on the second line from the top and 2 spaces in from the left edge.
36.  means:
- "let it stand."
  - "delete."
  - "transpose."
37. When you type a memorandum in block style:
- begin all lines at the left margin.
  - indent the first line of each paragraph.
  - indent the dateline and subject line.
38. When using correction paper, place it:
- in front of the cardholder.
  - between the carrier and the cardholder.
  - between the cardholder and the paper.
39. In a business letter typed in modified block style, type the dateline:
- beginning at the left margin.
  - indented 5 spaces from the left.
  - beginning at the center or 5 spaces to the right of center.
40. Always type the return address on an envelope or a postal card using:
- single spacing.
  - double spacing.
  - triple spacing.
41.  means:
- "single-space."
  - "italics (underline)."
  - "let it stand."
42.  means:
- "move to the left."
  - "move to the right."
  - "center."
43. When you type a medium letter on an elite typewriter, use a \_\_\_\_\_-space line.
- 50
  - 60
  - 70

44. Type the zip code:
- on the same line as the state abbreviation and 1 space to the right.
  - on the same line as the street address and 1 space to the right.
  - below the last line of the address and 1 space to the right of the longest line.
45. Between the inside address and the salutation in a business letter, leave \_\_\_\_\_ blank line(s).
- 2
  - 1
  - 0
46. When you type a business letter on letterhead stationery, type the dateline \_\_\_\_\_ the letterhead.
- a double space below
  - a double space above
  - to the right of
47. To vertically center 10 lines of double-spaced copy on a half sheet of standard-size typing paper, begin typing on line \_\_\_\_\_.
- 6
  - 7
  - 8
48. On a small envelope, begin typing the recipient's address:
- on the ninth line down from the top and 1 inch in from the left edge.
  - on the twelfth line down from the top and 2 inches in from the left edge.
  - on the fifteenth line down from the top and 1 ½ inches in from the left edge.
49. When you use mixed punctuation in a letter, type \_\_\_\_\_ after the complimentary close.
- a colon
  - a comma
  - no punctuation
50. When typing a personal letter in block style:
- begin all lines except the return address and the dateline at the left margin.
  - begin all lines except the dateline and complimentary close at the left margin.
  - begin all lines, without exception, at the left margin.

**THIS IS THE END OF THEORY TEST 3**

# Theory Test 4

## INSTRUCTIONS

---

Select the alternative (a, b, or c) that best completes each statement. Record your choice on the answer sheet by blackening the space under the letter that indicates your choice. Do not mark the test itself.

1. Center the title of a manuscript and type it:
  - a. in all capital letters.
  - b. in spread letters.
  - c. with normal capitalization.
2. To move the carrier from one column to the next when typing material in vertically aligned columns, use:
  - a. the space bar.
  - b. the margin release key.
  - c. the tabulator key.
3. When typing an outline, separate the period following a roman numeral from the topic heading by \_\_\_\_\_ spaces.
  - a. 1
  - b. 2
  - c. 3
4. Manuscripts are usually:
  - a. double-spaced.
  - b. single-spaced.
  - c. triple-spaced.
5. Which of the following words is divided correctly?
  - a. descript-ive
  - b. manu-script
  - c. cross-examina-tion

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6. You may divide:
  - a. a word before a comma.
  - b. the last word in a paragraph.
  - c. the last word on a page.
7. Type the first line of a footnote:
  - a. beginning at the left margin.
  - b. indented 3 spaces.
  - c. indented 5 spaces.
8. When assembling a carbon pack, place a sheet of carbon paper:
  - a. carbon side down over a sheet of lightweight paper.
  - b. carbon side up over a sheet of lightweight paper.
  - c. carbon side down over a sheet of letterhead paper.
9. When two or more footnotes are typed on the same page,  
\_\_\_\_\_ between them.
  - a. single-space
  - b. double-space
  - c. triple-space
10. If a manuscript with footnote references does not fill the last page, type the footnotes:
  - a. on a separate page at the end of the manuscript.
  - b. a double space below the last line of the manuscript.
  - c. so the page has a bottom margin of 6 blank lines.
11. The best way to divide the word *evacuation* is:
  - a. evac-uation.
  - b. evacu-ation.
  - c. evacua-tion.
12. Between the footnote dividing line and the footnote, leave \_\_\_\_\_ blank line(s).
  - a. 1
  - b. 2
  - c. 3
13. A raised number typed in a manuscript to refer to a footnote is called:
  - a. an asterisk.
  - b. an ampersand.
  - c. a superior number.
14. Between the title and the body of a manuscript, you should:
  - a. single-space.
  - b. double-space.
  - c. triple-space.

15. To set a tab stop for the third column in a table, space forward, counting the characters and spaces, from:
- the second tab stop.
  - the centering point.
  - the right margin setting.
16. In a typed outline, leave 1 blank line:
- before and after every typed line.
  - before and after major headings.
  - only after the title.
17. When correcting an error on a letter typed with 3 carbon copies, use:
- a protective card and 1 piece of correction paper.
  - 4 pieces of correction paper.
  - 3 pieces of correction paper.
18. When drawing horizontal lines with the typewriter, use:
- the cardholder.
  - the index key.
  - the paper guide.
19. When using the typewriter to draw vertical lines, pull the ratchet release lever (line finder) forward and use:
- the tabulator key.
  - the carrier return key.
  - the cylinder knob or the index key.
20. When typing an outline, the top margin that you would normally use is \_\_\_\_\_ blank lines.
- 10
  - 12
  - 15
21. The basic rule for dividing a word at the end of a line in typewritten copy is to divide only:
- between consonants.
  - between vowels.
  - between syllables.
22. To type the first line of each paragraph of a manuscript \_\_\_\_\_ from the left margin.
- do not indent
  - indent 5 spaces
  - indent 10 spaces
23. To know exactly how many lines remain to be typed on a page, use:
- the copy guide scale.
  - a page-end indicator.
  - the variable line spacer.

24. If the paper is centered on 50, to leave 10 spaces between the columns in the table below, set the left margin stop at \_\_\_\_\_.
- 20
  - 23
  - 25
- |          |            |              |
|----------|------------|--------------|
| Maine    | New Jersey | Montana      |
| Idaho    | Kentucky   | North Dakota |
| Michigan | Missouri   | South Dakota |
25. When you are making two carbon copies and wish to erase an error on the original, place a protective card between the carbon paper and:
- the first copy.
  - the second copy.
  - the original.
26. For a top-bound manuscript, leave left and right margins of at least \_\_\_\_\_.
- 1½ inches
  - 1 inch
  - 2 inches
27. The subheadings in an outline are preceded by:
- capital letters.
  - arabic numerals.
  - roman numerals.
28. Between the page number and the first line of copy on the second and subsequent pages of an unbound manuscript, leave \_\_\_\_\_ blank lines.
- 1
  - 2
  - 3
29. The technique you use to set up columns so that they are evenly spaced across a page is called:
- tabulation.
  - alignment.
  - spreading.
30. For an unbound manuscript, leave left and right margins of at least:
- 1 inch.
  - 1½ inches.
  - 2 inches.

31. If the paper is centered on 50, to leave 8 spaces between the columns in the table below, set the tab stop for the second column at \_\_\_\_\_.

- a. 34
- b. 42
- c. 50

Seattle	Chicago	Atlanta
New York	Denver	New Orleans
Detroit	San Francisco	Miami

32. Regardless of the position of the page numbers, leave a *minimum* bottom margin on all typewritten manuscript pages of \_\_\_\_\_ blank lines.
- a. 3
  - b. 5
  - c. 6
33. The technique of putting a typed page back into the typewriter and finding the exact point at which you were previously typing is called:
- a. alignment.
  - b. tabulation.
  - c. spreading.
34. For a left-bound manuscript, leave a left margin of at least:
- a. 1 inch.
  - b. 1½ inches.
  - c. 2 inches.
35. After inserting a carbon pack into the typewriter, you can release the pressure and straighten the sheets by operating:
- a. the ratchet release lever.
  - b. the variable line spacer.
  - c. the paper release lever.
36. Which of the following words is divided *correctly*?
- a. syllab-le
  - b. avail-able
  - c. beginn-ing
37. When using the backspace method for tabulation, backspace from the center:
- a. 2 spaces for every letter or space.
  - b. 1 space for every 2 letters or spaces.
  - c. 2 spaces for every 2 letters or spaces.
38. Between the title of an outline and the first major heading, leave a \_\_\_\_\_ space.
- a. single
  - b. double
  - c. triple



39. To position the cylinder to type a footnote reference number on a typewriter without half-line spacing, use:
- the variable line spacer.
  - the ratchet release lever.
  - the line space selector.
40. Hyphenated words:
- may be divided between syllables.
  - may be divided only at the hyphen.
  - may not be divided.
41. On the second and subsequent pages of an unbound manuscript, type the page number:
- even with the right margin and 3 blank lines from the top edge of the paper.
  - even with the left margin and 3 blank lines from the top edge of the paper.
  - centered at the bottom of the page and 3 blank lines from the bottom edge of the paper.
42. On a manuscript page with footnotes, maintain a 1-inch bottom margin by leaving extra space:
- below the footnote dividing line.
  - above the footnote dividing line.
  - between footnotes.
43. Between the superior number and the footnote:
- do not space.
  - space once.
  - space twice.
44. In typewritten copy, book titles are usually:
- underlined.
  - typed in all capital letters.
  - enclosed in quotation marks.
45. When reinserting and realigning a typed page in the typewriter, use:
- the variable line spacer.
  - the margin release key.
  - the line space selector.
46. The footnote dividing line is usually \_\_\_\_\_ inch(es) long.
- 1
  - 2
  - 3
47. In a typed outline, the periods following the roman numerals should:
- be aligned.
  - not be aligned.
  - be typed at the left margin.

48. When you type a top-bound manuscript, make sure the page numbers are:
- typed in the upper right corner of every page.
  - centered at the bottom of the first page and in the upper right corner of all other pages.
  - centered at the bottom of every page.
49. In a typewritten manuscript, footnotes are:
- single-spaced.
  - double-spaced.
  - triple-spaced.
50. On the first page of an unbound manuscript, leave a top margin of \_\_\_\_\_ blank lines.
- 6
  - 12
  - 13

**THIS IS THE END OF THEORY TEST 4**

## Production Test 1

### WHAT YOU'LL NEED FOR PRODUCTION TEST 1

- 1 half sheet of typing paper
- 1 full sheet of typing paper
- 1 sheet of letterhead stationery
- 1 postal card form (or paper cut to size:  $5\frac{1}{2} \times 3\frac{1}{4}$  inches, or  $14 \times 8.6$  cm)
- 1 small envelope (No. 6 $\frac{1}{4}$ , or paper cut to size:  $6\frac{1}{2} \times 3\frac{3}{8}$  inches, or  $16.5 \times 9.2$  cm)

### INSTRUCTIONS

This is a timed test. Do not open the test booklet or read the instructions for the test problems until your instructor tells you to begin or until you have started the Production Test Tape. You will have 5 minutes to read through the instructions and the problems. Then you will be timed for 20 minutes or for the time designated by your instructor.

When time is called, take the test booklet and all your work to your instructor for correction and grading.

Note the following points that apply to the test as a whole:

1. Do each part of the test in order.
2. Start the test over if you finish it before time is called.
3. Proofread carefully and correct all errors. Only unidentified errors will count against your grade.
4. Do not divide words at the ends of lines.

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PROBLEM I: MEMORANDUM IN BLOCK STYLE

---

Type the following memorandum in block style, according to the instructions given on the right.

1. Half sheet of typing paper
2. Paper horizontally centered
3. 60-space line
4. Single spacing
5. Today's date

SUBJECT: Production Tests

A production test is a practical measure of your typing skill. The problems are similar, both in content and time limit, to things you might be expected to type in a typical business office. Therefore, a production test will give you an idea of the kinds of pressures you may be working under some day.

Organization, and the ability to plan work and budget time are important elements in performing well on a production test. Before starting a production test, prepare yourself by glancing at the problems and organizing your materials so they are ready when you need them.

PROBLEM II: POSTAL CARD

---

Type the information below on a postal card.  
Follow the instructions given on the right.

1. Postal card
2. Today's date

Return address:

Plaza Shopping Mall  
7689 Bonaventure Drive  
Topeka, KS 66606

Send to:

Mrs. Ralph Young  
9001 Hacker Drive  
Topeka, KS 66621

Dear Mrs. Young

The fourteen lawn chairs that you ordered last week have arrived. You may pick them up from our order department at your convenience.

You may charge this order to your revolving credit account and pay for it in small monthly installments.

Karen Dowell, Manager

**PROBLEM III: SHORT THEME**


---

Type the short theme below, following the instructions given at the right. As you type, correct all errors indicated by the proofreader's marks on the rough draft.

1. Full sheet of typing paper
2. Paper horizontally centered
3. 60-space line
4. 5-space paragraph indentation
5. Double spacing

### ] CLEANING YOUR TYPEWRITER [

Typewriter<sup>u</sup>, like other pieces of equipment with movable parts, need routine care and maintenance. Repairs will usually have to be made by a typewriter repairman, but you can help keep repairs to a minimum b<sup>y</sup> performing minor<sup>#</sup> cleaning tasks regularly.

Typing elements may be cleaned by using<sup>#</sup> the two brushes that are provided with the selectric typewriter. You may also use a specially-treated type-cleaning paper, rubbing alcohol, or a plastic cleaner <sup>gum</sup>.  
 ¶ The platen or cylinder and the typewriter body may be cleaned with a <sup>soft</sup> cloth that has been dampened in a solution of mild detergent and water. A special cleaning compound will remove correction fluid and other stubborn stains from the machine. Don't use <sup>h</sup> harsh cleansers or chemicals to clean any part of your machine as permanent damage may result.

**PROBLEM IV: BUSINESS LETTER WITH SMALL ENVELOPE** \_\_\_\_\_

Type the business letter below and address a small envelope for it. Follow the instructions given at the right.

Return address:

100 Capitol Avenue  
Lansing, MI 48901

1. Letterhead stationery
2. No. 6 ¼ envelope
3. Paper horizontally centered
4. Block style
5. Mixed punctuation
6. Today's date

Dr. Mary White, President  
East Lansing Area Zonta Club  
1717 South Grand River Avenue  
East Lansing, MI 48823

Dear Dr. White:

The actions of the Michigan legislature, the state courts, and the Governor's office affect each of us every day of our lives. Because it is sometimes difficult to keep up on the latest happenings in the state capitol, my office puts out a weekly report, entitled "Under the Dome."

I will send you a supply of these each week, at no cost, if you think they will be of interest to any of your members. The information in each report will be new and nonpolitical in nature.

A member of my staff will call you later this week to see if you are interested in receiving these reports. This is one way that you can be better informed about what the government is doing for you and to you.

Sincerely,

L. Michael Barnes  
District Representative

(Your reference initials)

**THIS IS THE END OF PRODUCTION TEST 1**

If time has not been called, go back to Problem I. Repeat as much of the test as you can before the timing period is over.

## Production Test 2

### WHAT YOU'LL NEED FOR PRODUCTION TEST 2

- 1 half sheet of typing paper
- 3 full sheets of typing paper
- 1 second sheet
- 1 sheet of carbon paper
- Page-end indicator prepared for Lesson 41

### INSTRUCTIONS

This is a timed test. Do not open the test booklet or read the instructions for the test problems until your instructor tells you to begin or until you have started the Production Test Tape. You will have 5 minutes to read through the instructions and the problems. Then you will be timed for 20 minutes or for the time designated by your instructor.

When time is called, take the test booklet and all your work to your instructor for correction and grading.

Note the following points that apply to the test as a whole:

1. Do each part of the test in order.
2. Start the test over if you finish it before time is called.
3. Proofread carefully and correct all errors. Only unidentified errors will count against your grade.
4. Divide words correctly if necessary.

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PROBLEM I: TABULATION

---

Type the two columns below in tabular format. Use the backspace method to set margins and tab stops. Center the title horizontally and triple-space after it.

1. Half sheet of typing paper
2. Paper horizontally centered
3. Double spacing
4. Space down 16 lines from top edge of paper
5. 12 spaces between columns

## TYPING ELEMENTS FOR GENERAL TYPING

Advocate

Prestige Elite 72

Courier 12

Prestige Pica 72

Letter Gothic

Bookface Academic 72

**PROBLEM II: OUTLINE WITH CARBON COPY**


---

Type the following outline in proper format to accompany a left-bound manuscript.

1. Full sheet of typing paper
2. One carbon copy
3. Paper horizontally centered
4. Top margin—12 blank lines

**TYPING CARBON COPIES**

- I. Assembling the carbon pack
  - A. Putting the pack together
  - B. Straightening the pack
  - C. Checking the position of the carbon paper
- II. Inserting the carbon pack into the typewriter
  - A. Putting the pack into the machine
  - B. Removing wrinkles or straightening the pack
  - C. Checking the position of the carbon paper
- III. Correcting errors
  - A. Positioning the error for correction
    1. Rolling the paper forward
    2. Rolling the paper backward
  - B. Correcting the original
    1. Inserting the protective card
    2. Erasing the error
  - C. Correcting the carbon copies
    1. Inserting the protective card
    2. Erasing the error
  - D. Repositioning
  - E. Typing the correct letter or character

### PROBLEM III: TOP-BOUND MANUSCRIPT WITH FOOTNOTES

---

Type the copy below as the first and second pages of a top-bound manuscript. Don't forget to allow for the footnotes at the bottom of the first page.

1. 2 full sheets of typing paper
2. Page-end indicator
3. Paper horizontally centered

#### A TREND: OFFICE LANDSCAPING

The term office landscaping was first introduced in 1960 in Germany by the Quickborner Team, a consulting firm based in Quickborn, a Hamburg suburb. In 1967 the first landscaped office in America was designed for Freon Products of E. I. du Pont de Nemours and Company in Wilmington, Delaware. This office was awarded Honorable Mention in 1967 as an AMS Office of the Year.<sup>1</sup>

The concept of office landscaping is that of clusters of functional work areas in a large open space instead of the conventional arrangement of walls and corridors, private offices, and ranks of desks with lanes between them.<sup>2</sup>

To create an effective office landscape, a building must be designed from the inside out. This requires the cooperation, from beginning to end, of the systems analysts, the architects, and the interior designers.<sup>3</sup> If the goal of effective office landscaping is to be achieved, the design of one office cannot be copied for another office. Each office must be designed for its own function and work flow. The overall design must provide for easy access to files and working materials, free communication among the people who work together, and close teamwork up and down the management scale. The ultimate goal is an operation that is more efficient and profitable.

Private offices are all but completely eliminated in the design of an office landscape. Work clusters are set off and partially screened by plants, by low partitions, and by cabinets. Attractive and comfortable office furniture, designed to function in a particular working area, helps to create an aesthetically pleasing atmosphere.<sup>4</sup>

---

<sup>1</sup>"America's First 'Landscaped' Office," Administrative Management (June 1968), 25.

<sup>2</sup>Ibid.

<sup>3</sup>Hans J. Lorenzen and Dieter Jaeger, "The Office Landscape: A 'Systems' Concept," AMS Professional Management Bulletin (April 1968), 1.

<sup>4</sup>"The Office in Transition," Administrative Management (January 1969), 27.

#### THIS IS THE END OF PRODUCTION TEST 2

If time has not been called, go back to Problem I. Repeat as much of the test as you can before the timing period is over.

## Unit Test

### INSTRUCTIONS

---

Select the alternative (a, b, or c) that best completes each statement. Record your choice on the answer sheet by blackening the space under the letter that indicates your choice. Do not mark the test itself.

1. When inserting paper into the machine, place the paper:
  - a. between the paper table and the cylinder.
  - b. between the cardholder and the carrier.
  - c. between the paper table and the copy guide scale.
2. You will type most efficiently if you:
  - a. move your hands and arms forward and backward freely.
  - b. rest your wrists on the frame of the typewriter.
  - c. keep your fingers on or near the home-row keys and your forearms parallel with the typewriter.
3. To remove paper from the typewriter:
  - a. pull the paper release lever forward with your left hand and remove the paper with your right hand.
  - b. pull the paper release lever forward with your right hand and remove the paper with your left hand.
  - c. pull the paper release lever forward and depress the index key.
4. To leave a blank space between two words, the space bar should be:
  - a. depressed slowly and deliberately.
  - b. struck with a quick down-and-in motion.
  - c. held down longer than the letter keys.

**GO ON TO THE NEXT PAGE.**

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5. To move the carrier back to the left margin and down to the next typing line, use:
  - a. the carrier return key.
  - b. the line space selector.
  - c. the space bar.
6. To see where the next character will be typed in relation to the margin scale, check:
  - a. the typing position indicator.
  - b. the margin set controls.
  - c. the line space selector.
7. To set the typewriter for single or double spacing, use:
  - a. the space bar.
  - b. the line space selector.
  - c. the backspace key.
8. To adjust the width of the typing line, use:
  - a. the typing position indicator.
  - b. the paper guide.
  - c. the margin set controls.
9. When you type, place your copy:
  - a. on the left of the typewriter.
  - b. next to the typing paper.
  - c. on the right of the typewriter.
10. "Type pitch" is the term used for the number of spaces and characters that can be typed:
  - a. per inch.
  - b. per line.
  - c. per page.
11. A full sheet of standard-size typing paper measures:
  - a. 8 inches wide  $\times$  11½ inches long (20.3 cm wide  $\times$  29.2 cm long).
  - b. 8½ inches wide  $\times$  11 inches long (21.6 cm wide  $\times$  27.9 cm long).
  - c. 8½ inches wide  $\times$  11½ inches long (21.6 cm wide  $\times$  29.2 cm long).
12. A pica typewriter is also called a \_\_\_\_\_ machine.
  - a. 10-pitch
  - b. 9-pitch
  - c. 12-pitch
13. On standard-size typing paper, the maximum line length for a pica typewriter is \_\_\_\_\_ characters and spaces.
  - a. 66
  - b. 85
  - c. 102




14. In a horizontal inch, there are \_\_\_\_\_ elite spaces.
  - a. 10
  - b. 11
  - c. 12
15. After a period at the end of a sentence:
  - a. do not space.
  - b. space once.
  - c. space twice.
16. After a period within an abbreviation:
  - a. do not space.
  - b. space once.
  - c. space twice.
17. After a semicolon:
  - a. do not space.
  - b. space once.
  - c. space twice.
18. To align paper properly in the typewriter, use:
  - a. the index key.
  - b. the paper lock rollers.
  - c. the variable line spacer.
19. When typing a single capital letter controlled by the left hand, use:
  - a. the left shift key.
  - b. the right shift key.
  - c. the shift lock.
20. To move the carrier to the left one space at a time, use:
  - a. the space bar.
  - b. the carrier return key.
  - c. the backspace key.
21. To move the paper up to the next typing line without returning the carrier to the left margin setting, use:
  - a. the index key.
  - b. the carrier return key.
  - c. the variable line spacer.
22. To change the pitch from pica to elite on a Selectric II machine, use:
  - a. the line space selector.
  - b. the typing position indicator.
  - c. the dual-pitch lever.
23. On a Selectric II machine, to move the carrier to the left quickly, use:
  - a. the express backspace key.
  - b. the index key.
  - c. the space bar.

24. After a comma in a sentence:
- do not space.
  - space once.
  - space twice.
25. After a question mark at the end of a sentence:
- do not space.
  - space once.
  - space twice.
26. The vertical line at the top of the plastic cardholder is always in vertical alignment:
- with the typing position indicator.
  - with the horizontal centering point.
  - with the margin setting.
27. For a 50-space typing line with the paper centered and the centering point at 43, set the left margin on \_\_\_\_\_.
- 13
  - 18
  - 23
28. For a 60-space typing line with the paper centered, the centering point at 66, and a bell allowance of 12, set the right margin on \_\_\_\_\_.
- 93
  - 96
  - 105
29. To set a tab stop for a 5-space paragraph indentation, space in 5 times from the left margin and depress:
- the "clear" end of the tabulator control key.
  - the "set" end of the tabulator control key.
  - the tabulator key.
30. In figuring GWAM, 1 word is equal to \_\_\_\_\_ strokes.
- 8
  - 5
  - 10
31. To determine your GWAM on a 3-minute timed writing, divide the total number of words typed by \_\_\_\_\_.
- 3
  - 5
  - 10
32. If your 1-minute base rate is 20, your  $\frac{1}{4}$ -minute accuracy goal would be \_\_\_\_\_.
- 4
  - 5
  - 6

33. If your typewriter does not have a special key for the numeral 1, use:
- the capital L.
  - the diagonal.
  - the lowercase L.
34. After a colon used within a sentence:
- do not space.
  - space once.
  - space twice.
35. After a colon used to separate hours and minutes in an expression of time:
- do not space.
  - space once.
  - space twice.
36. To regulate the amount of pressure with which the typing element strikes the paper, adjust:
- the ribbon control mechanism.
  - the impression control.
  - the paper release lever.
37. Type a street name that is a number above ten:
- in figures.
  - spelled out.
  - to match the format of the house number.
38. To type a dash, use:
- one hyphen.
  - two hyphens.
  - two underlines.
39. Before and after a hyphen within a word:
- space once.
  - space twice.
  - do not space.
40. Between a dollar sign and the following figure:
- do not space.
  - space once.
  - space twice.
41. Before and after an apostrophe used within a word:
- space once.
  - space twice.
  - do not space.
42. Between a number symbol and the figure with which it is typed:
- do not space.
  - space once.
  - space twice.



43. Between parentheses and the word or words they enclose:
- do not space.
  - space once.
  - space twice.
44. Before and after an ampersand in a company name:
- do not space.
  - space once.
  - space twice.
45. To type an exclamation point on a machine that does not have a special exclamation point key, type a period with \_\_\_\_\_ above it.
- a diagonal
  - a lowercase *L*
  - an apostrophe
46. A comma that follows underlined copy is \_\_\_\_\_ underlined.
- always
  - never
  - sometimes
47. Between a percent sign and a number:
- do not space.
  - space once.
  - space twice.
48. Before and after an "at" sign:
- do not space.
  - space once.
  - space twice.
49. In a business letter or other text material, type an amount of money under \$1:
- in figures, with the word *cents* spelled out.
  - in figures, with a decimal point and a dollar sign.
  - in figures, with *¢*.
50. Type a series of two or more mixed numbers in copy as \_\_\_\_\_
- 35½ and 5 3/8
  - 35 ½ and 5 3/8
  - 35 1/2 and 5 3/8
51. To leave a top margin of 1½ inches, begin typing on line \_\_\_\_\_.
- 8
  - 9
  - 10

52. The correct format for a dateline in a letter or memorandum is:
- 12/12/78.
  - October 12, 1978.
  - Oct. 12, 1978.
53. When typing a spread title, leave:
- 1 space between letters and 3 spaces between words.
  - 2 spaces between letters and 3 spaces between words.
  - 1 space between letters and 2 spaces between words.
54. To center a line horizontally, backspace from the center:
- once for every letter or space in the line.
  - twice for every letter or space in the line.
  - once for every 2 letters or spaces in the line.
55.  means:
- transpose.
  - add space.
  - delete.
56.  means:
- "align."
  - "lowercase."
  - "let it stand."
57.  means:
- "capitalize."
  - "italics."
  - "triple-space."
58. Before erasing an error at the center of the paper:
- roll the paper down and pull it forward, using the front of the typewriter cover as a firm surface.
  - roll the paper up and use the cylinder as a firm surface.
  - roll the paper up and use the paper table as a firm surface.
59. When using correction paper to correct an error, place it:
- in front of the cardholder.
  - between the carrier and the cardholder.
  - between the cardholder and the paper.
60. Type the zip code:
- on the same line as the state abbreviation and 1 space to the right.
  - on the same line as the street address and 1 space to the right.
  - below the last line in the address and 1 space to the right of the longest line.
61. On a postal card, begin typing the recipient's address:
- at the horizontal center of the postal card and on line 9.
  - 5 to 8 spaces to the left of the horizontal center and on line 10.
  - 2 inches in from the left edge and on line 11.

62. When typing the message side of a postal card, use a \_\_\_\_\_ typing line.
- 4-inch
  - 4½-inch
  - 5-inch
63. The recipient's address on an envelope or a postal card should always be:
- single-spaced.
  - double-spaced.
  - triple-spaced.
64. To vertically center 10 lines of double-spaced copy on a half sheet of standard-size typing paper, begin typing on line \_\_\_\_\_.
- 6
  - 7
  - 8
65. When typing a personal letter in block style:
- begin all lines, without exception, at the left margin.
  - begin all lines except the return address and the dateline at the left margin.
  - begin all lines except the dateline and complimentary close at the left margin.
66. When you use open punctuation in a letter, type \_\_\_\_\_ after the salutation.
- a comma
  - a colon
  - no punctuation
67. When typing a personal letter, begin the return address on line \_\_\_\_\_.
- 10
  - 11
  - 12
68. When you use mixed punctuation in a letter, type \_\_\_\_\_ after the complimentary close.
- a colon
  - a comma
  - no punctuation
69. The dateline and the inside address on a medium letter are separated by \_\_\_\_\_ blank lines.
- 5 to 7
  - 8 to 10
  - 10 to 12
70. For a medium letter, use a line length of \_\_\_\_\_ spaces.
- 60
  - 50
  - 60 pica or 70 elite

71. On a small envelope, begin typing the recipient's address:
- on line 9 at the horizontal center of the envelope.
  - on line 12 and 2 inches in from the left edge.
  - on line 15 and 5 to 8 spaces to the left of the horizontal center.
72. Begin typing the return address on a small envelope:
- on the second line from the top and 3 spaces in from the left edge.
  - on the third line from the top and 2 spaces in from the left edge.
  - on the second line from the top and 2 spaces in from the left edge.
73. After the title of a theme, you should:
- double-space.
  - triple-space.
  - leave 3 blank lines.
74. After each paragraph in a letter, you should:
- single-space.
  - double-space.
  - triple-space.
75. When typing a business letter in modified block style, begin the dateline:
- at the left margin.
  - indented 5 spaces from the left.
  - at the center or 5 spaces to the right of the center.
76. When drawing horizontal lines with the typewriter, use:
- the cardholder.
  - the index key.
  - the paper guide.
77. To set a tab stop for the third column in a table, space forward, counting the characters and spaces, from:
- the second tab stop.
  - the centering point.
  - the right margin setting.
78. The technique of putting a typed page back into the typewriter and finding the exact point at which you were previously typing is called:
- tabulation.
  - alignment.
  - spreading.
79. To move the carrier from one column to the next when typing material in vertically aligned columns, use:
- the space bar.
  - the margin release key.
  - the tabulator key.

80. If the paper is centered on 50, to leave 10 spaces between the columns in the table below, set the tab stop for the second column at \_\_\_\_\_.

- a. 34
- b. 44
- c. 54

Dallas  
St. Paul  
Boston

Washington  
Kansas City  
St. Louis

Phoenix  
San Diego  
Boise

81. The basic rule for dividing a word at the end of a line in typewritten copy is to divide only:
- a. between consonants.
  - b. between vowels.
  - c. between syllables.
82. Hyphenated words:
- a. may be divided between syllables.
  - b. may be divided only at the hyphen.
  - c. may not be divided.
83. You may divide:
- a. a word before a comma.
  - b. the last word in a paragraph.
  - c. the last word on a page.
84. When you are making two carbon copies and wish to erase an error on the original, place a protective card between the carbon paper and:
- a. the first copy.
  - b. the second copy.
  - c. the original.
85. When assembling a carbon pack, place a sheet of carbon paper:
- a. carbon side down over a sheet of lightweight paper.
  - b. carbon side up over a sheet of lightweight paper.
  - c. carbon side down over a sheet of letterhead paper.
86. After inserting a carbon pack into the typewriter, release the pressure and straighten the sheets by operating:
- a. the ratchet release lever.
  - b. the variable line spacer.
  - c. the paper release lever.
87. When typing an outline, the top margin that you would normally use is \_\_\_\_\_ blank lines.
- a. 10
  - b. 12
  - c. 15

88. When typing an outline, double-space:
- before and after every line.
  - before and after major headings.
  - only after the title.
89. The subheadings in an outline are preceded by:
- capital letters.
  - arabic numerals.
  - roman numerals.
90. On the first page of an unbound manuscript, leave a top margin of \_\_\_\_\_ blank lines.
- 6
  - 12
  - 13
91. Regardless of the position of the page numbers, leave a *minimum* bottom margin on all typewritten manuscript pages of \_\_\_\_\_ blank lines.
- 3
  - 5
  - 6
92. Between the page number and the first line of copy on the second and subsequent pages of an unbound manuscript, leave \_\_\_\_\_ blank lines.
- 1
  - 2
  - 3
93. On a top-bound manuscript, leave left and right margins of at least:
- 1 inch.
  - 1½ inches.
  - 2 inches.
94. On a left-bound manuscript, leave a left margin of at least:
- 1 inch.
  - 1½ inches.
  - 2 inches.
95. Type the page numbers in a top-bound manuscript:
- centered at the bottom of every page.
  - in the upper right corner of every page.
  - centered at the bottom of the first page and in the upper right corner of all other pages.
96. To know exactly how many lines remain to be typed on a page, use:
- the copy guide scale.
  - a page-end indicator.
  - the variable line spacer.

97. In a typewritten manuscript, footnotes should be:
  - a. single-spaced.
  - b. double-spaced.
  - c. triple-spaced.
98. On a manuscript page with footnotes, maintain a 1-inch bottom margin by leaving extra space:
  - a. below the footnote dividing line.
  - b. above the footnote dividing line.
  - c. between footnotes.
99. To position the cylinder to type a footnote reference number on a typewriter without half-line spacing, use:
  - a. the variable line spacer.
  - b. the ratchet release lever.
  - c. the line space selector.
100. If a manuscript with footnote references does not fill the last page, type the footnotes:
  - a. on a separate page at the end of the manuscript.
  - b. a double space below the last line of the manuscript.
  - c. so the page has a bottom margin of 6 blank lines.

**THIS IS THE END OF THE UNIT TEST**

## APPENDIX G

### SUGGESTED AVT GRADE SCALES



## SUGGESTED AVT SPEED & ACCURACY GRADING SCALE

The following table indicates the grades assigned to various typing speeds with the numerical equivalent of each grade for averaging purposes.

GWAM	Grade	Numerical Equivalent
36+	A	4.0
35	B+	3.3
32-34	B	3.0
31	B-	2.7
30	C+	2.3
27-29	C	2.0
26	C-	1.7
25	D+	1.3
22-24	D	1.0
21	D-	.7

Computing the Final Grade. The following example shows how grades on timed writings and tests are combined to determine the final grade for the AVT Introductory Typing 1 course. First convert the GWAM for each of three best timed writings, with adjustments made for errors if necessary, from grades to the numerical equivalents. Average these numbers.

GWAM	Grade	Numerical Equivalent
30	C+	2.3
32	B	3.0
26	C-	1.7
		<hr/> 7.0

7.0 divided by 3 = 2.33

Next, convert test grades to numerical equivalents and average.

	Test Score	Grade	Numerical Equivalent
Theory Test 1	92%	B+	3.3
Theory Test 2	86%	C+	2.3
Theory Test 3	95%	A	4.0
Production Test 1	14	B-	2.7
Theory Test 4	82%	C	2.0
Production Test 2	14	C	2.0
Unit Test	90%	B	<u>3.0</u>
			19.3

19.3 divided by 7 = 2.76

Finally, find the average of the timed writing and test equivalents. Convert to a letter grade.

$2.33 + 2.76 = 5.09$  divided by 2 = 2.55 = C+

## SUGGESTED AVT PRODUCTION GRADING SCALE

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Production Test 1 (Lesson 34)

NPRAM	Grade
16+	A
14-15	B
11-13	C
9-10	D

## Production Test 2 (Lesson 43)

NPRAM	Grade
18+	A
16-17	B
13-15	C
11-12	D

---

You can adjust these grading scales as necessary to conform to your institution's standards.

These keys, like the typing problem answer keys, should be regarded as a general guide to correctly typed copy. Allow students some latitude in position and style.

## SUGGESTED AVT THEORY GRADING SCALE

Theory and unit test answer keys each have a suggested grading scale printed below. This is a suggested scale; adjust it as necessary to conform to your institution's standards.

Instructions for the tests are reproduced on the keys.

Lesson numbers from which each question was drawn are printed to the right of each answer box.

## THEORY TESTS

1-4

<u>Correct Responses</u>	<u>Percentage</u>	<u>Letter Grade</u>
50	100%	A
49	98	A
48	96	A
47	94	A-
46	92	B+
45	90	B
44	88	B-
43	86	C+
42	84	C
41	82	C
40	80	C-
39	78	C-
38	76	D+
37	74	D
36	72	D
35	70	D-
34-0 Unsatisfactory		

## UNIT TEST

<u>Correct Responses &amp; Percentage</u>	<u>Letter Grade</u>
96-100	A
94-95	A-
92-93	B+
90-91	B
88-89	B-
86-87	C+
80-85	C
78-79	C-
76-77	D+
72-75	D
70-71	D-
0-69	Unsatisfactory

## APPENDIX H

### KOLMOGOROV - SMIRNOV STATISTICAL TABLE

Table 55. The Kolmogorov two-sample test. Upper critical values of  $c = mnD_{m,n}$

$\alpha$ $n$	$m = 1$						$m = 2$						$n$
	.100	.050	.025	.010	.005	.001	.100	.050	.025	.010	.005	.001	
2													2
3													3
4							--						4
5							10						5
6							12						6
7							14	--					7
8							(16)	16					8
9							(18)	18					9
10							18	20					10
11							20	22	--				11
12							22	(24)	24				12
13							24	(26)	26				13
14							24	26	28				14
15							26	28	30				15
16							28	30	32				16
17							30	32	34				17
18							32	34	36	--			18
19	19						32	36	(38)	38			19
20	20						34	38	(40)	40			20
21	21						36	38	40	42			21
22	22						38	40	42	44			22
23	23						38	42	44	46			23
24	24						40	44	46	48			24
25	25	--					42	46	48	50			25

$\alpha$ $n$	$m = 3$						$m = 4$						$n$
	.100	.050	.025	.010	.005	.001	.100	.050	.025	.010	.005	.001	
3													3
4	9						(16)	16	--				4
5	(15)	15	--				16	(20)	20	--			5
6	15	(18)	18				18	20	(24)	24			6
7	18	(21)	21				21	24	(28)	28	--		7
8	(21)	21	24	--			24	(28)	28	(32)	32		8
9	21	24	(27)	27			27	28	32	(36)	36		9
10	24	27	(30)	30			28	30	(36)	36	40		10
11	27	(30)	30	33	--		29	33	36	40	44		11
12	27	30	33	(36)	36		(36)	36	40	44	48	--	12
13	30	33	36	(39)	39		35	39	44	(48)	48	52	13
14	33	36	39	(42)	42		38	42	44	48	52	56	14
15	33	36	39	42	45		40	44	45	52	56	50	15
16	36	39	42	45	48		44	48	52	56	60	64	16
17	36	42	45	48	51		44	48	52	60	64	68	17
18	39	45	48	51	54		46	50	54	60	64	72	18
19	42	45	51	54	57		49	53	57	64	68	76	19
20	42	48	51	57	57	--	52	60	64	68	72	76	20
21	45	51	54	57	60	63	52	59	63	72	76	80	21
22	48	51	57	60	63	66	56	62	66	72	76	84	22
23	48	54	60	63	66	69	57	64	69	76	80	88	23
24	51	57	60	66	69	72	60	68	72	80	84	92	24
25	54	60	63	69	72	75	63	68	75	84	88	96	25

The entries are the smallest value of  $c$  for which  $\Pr\{D_{m,n} \geq c(mn)\} \leq \alpha$  where  $\alpha$  is shown at the head of each column. A blank space indicates that for this particular combination of  $m, n$  no value of  $c$  is significant at that level. Owing to the discontinuous nature of the distribution cases occur where the same value of  $c$  corresponds to two  $\alpha$ -levels; in such cases the value corresponding to the larger  $\alpha$  is repeated within parentheses.

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Lester L. Rosenbloom was born on July 23, 1942, in Nashville, Tennessee, and graduated from Hillsboro High School in Nashville in 1960. He graduated from the University of Tennessee in 1965 with a Bachelor of Science degree in business administration with a major in marketing. In 1966, he graduated from the University of Alabama with a Master of Business Administration with an emphasis in marketing management. He spent two years as marketing systems manager for First Medical Data Services, a Division of Healthco of Boston, Massachusetts. He then became an instructor of marketing at Corning Community College in Corning, New York. From 1971 through 1976, he served as Chairman of the Business Administration Division at Corning, resigning in 1976 to enroll in the Educational Specialist Program in instructional design and educational media at the University of Florida. He went on to complete the Ed.S. in 1977 and then the Ph.D. in 1979. He is presently an Associate Professor of Marketing and Coordinator of Adjunct Faculty Development at Corning.

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I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.



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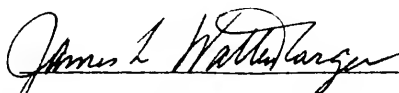
Arthur J. Lewis, Chairman  
Professor of Education  
and  
Director, Division of Curriculum  
and Instruction

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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Laurel Dickerson  
Assistant Professor  
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Support

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

A handwritten signature in dark ink, reading "James L. Wattenburger", written over a horizontal line.

James L. Wattenburger  
Professor of Educational  
Administration and Supervision

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

A handwritten signature in dark ink, reading "Ronald K. Bass", written over a horizontal line.

Ronald K. Bass  
Associate Professor  
Department of Dental Education



This dissertation was submitted to the Graduate Faculty of the Division of Curriculum and Instruction in the College of Education and to the Graduate Council, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

December, 1979

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